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The CONTENTS of the *TRACTS* contain'd in the Second Volume of *Bibliotheca Anatomica, &c.*

THE Introduction of Lyſerus's Culter Anatomicus. Page 1

Of the Abdomen *or Region of the Belly; from the ſame Author*, Lib. I. Cap. I. 5

Of the Thorax, *or* Breaſt, Lib. II. Cap. I. 24

Of the Head, Lib. III. Cap. I. 29

Of the Limbs, Lib. IV. 42

Of the Skin, as the Cuticula, Cutis, *Veſſels, Glands, Pores, and Membranes of the Skin, with the* Membrana Adipoſa *and* Carnoſa. *From* Gliſſon, Malpighius, *and others.* 62

The Myology or Doctrine of the Muſcles. Taken out of Mr. St. Hilaire, *his Anatomy of the Humane Body*, 67

Myologia, *or the Doctrine of the Muſcles. From Mr.* Cowper's Myotomia Reformata, *or a new Adminiſtration of all the Muſcles of Humane Bodies*, 85

A Deſcription of a Muſcle in General, its Compoſition and Motion. From ſeveral Authors, 134

An Appendix, containing a Deſcription of the Penis, &c. 142

A Deſcription of the Eye, with all the Parts thereunto belonging; taken from a particular Treatiſe of the Diſeaſes of the Eyes, and the proper Remedies for their Cure: Writ by Mr. Antoine Maitre-Jan, *Sworn Surgeon to the* French *King.* 150

A Treatiſe of the Ear, in which the whole Fabrick thereof is deſcribed, and illuſtrated with many new Cuts and Diſcoveries, together with the Uſe of all the Parts. Taken from a Treatiſe of Valſalva's, *Profeſſor of Anatomy in the Univerſity of* Bononia, *and Surgeon to the Hoſpital of* Incurables. *Printed at* Utrecht, 1707. 207

Of the Diſeaſes of the Ear, from the Sieur de Saint Hilaire, *and others*, 232

The Diſeaſes of the Ears, from Barbett, &c. 237

A Specimen of Obſervations upon the Muſcles: Taken from that noble Anatomiſt Nicholas Steno, 238

Of the Height and Stature of Charles the Great, *by the* French *called* Charlemaine, *King of the* Franks, *and Firſt Emperor of* Germany. *Written by* Marquardus Freherus, 249

The Learned Willis's Exercitatio Medico Phyſica, *concerning the Motion of the Muſcles*, Page 251

A Phyſical Diſquiſition of Angelus Victorius, *a* Roman *Phyſician, concerning the Palpitation of the Heart, the Breaking of the Ribs, and other Indiſpoſitions of* Philip Nereus, *the Founder of a* Roman *Orator. Inſcrib'd to Cardinal* Boromæus. *Printed at* Rome, *by the Pope's Printer, in the Year* 1613. 266

Concerning the Motion of the Muſcles. From the ingenious Mayow, 269.

Of the ſeveral Diſeaſes of the Muſcles, and their Cures; and firſt of the Chirurgical Operations belonging to the Suture, *the Eye-lids, the Eye-laſhes, the Tunicles of the Eyes, the Corners of the Eyes, the Ears, the Tongue,* Uvula, *and the Hare-lip*, 275

Of Wounds in General; and of thoſe belonging to the Muſcles in Particular. From Wiſeman, Muſitanus, Belloſte, Le Clerk, St. Hilaire, Etmuller, Charrierre *and* Vaugion, 295

Of Ulcers in General, 322

Of Ulcers. From Muſitanus, Etmuller, &c. 325 to 328

Obſervations of Phagædenick *and* Nomous *Ulcers*, &c. *From Mr.* Wiſeman, 328, 336

Of Gun-ſhot Wounds. From the ſame Author, and others, 336 to 351

Of the Suture *of the* Tendon. *From Mr.* Dionis, 351

Of opening the Abſceſs, 357

Of Enkyſtated or Tunicated Tumours, 361

Of Cauteries, Iſſues or Fontanels, 363

Of Cupping, 365

Of Bliſters and Leaches, 367

A curious Tract of Tumours in General: Taken from Monſieur St. Hilaire's *Anatomy of the Humane Body, and its Diſeaſes*, 369

A general Deſcription of the Membranes, Nerves, Fibres, Veins and Arteries: Taken from St. Hilaire, Le Clerk, Gliſſon, Willis, Vieuſſens, Diemerbroeck, &c. 393

An Account of divers Schemes of Arteries and Veins diſſected from adult humane Bodies, and given to the Repoſitory of the Royal Society, by John Evelyn *Eſq; F. R. S. To which are ſubjoin'd, A Deſcription of the Extremities*

trenities of thoſe Veſſels, and the Manner the Blood is ſeen by a Microſcope to paſs from the Arteries to the Veins in Quadrupeds, *when living: With ſome Chirurgical Obſervations and Figures after the Life. By* William Cowper, *F. R. S. Taken from the Philoſophical Tranſactions,* N° 280. *for* July *and* Auguſt, 1702. Page 405

Of the Wounds of the Nerves, Veins and Arteries. From Mr. Wiſeman, *and others,* 416

Of the Aneuriſm, *that is, the Dilatation or Rupture of an Artery. From Mr.* Dionis *and* Muſitanus, 423

Of the Varix, *and its Operation. From Mr.* Dionis's *Courſe of Chirurgical Operations,* 429

A Deſcription of the Glands, Lacteals, Lymphducts, &c. *and their Uſes. From* Wharton, Peyerus, Aſellius, Pecquet, Nuck, Malpighius, Bartholin, Bidloo, &c. 431

Of the King's Evil, *with its Methods of Cure,* &c. 455

Of the Ophthalmia Strumoſa, Fiſtula Lachrymalis, Tonſillæ, &c. *From* Wiſeman, 465

Of the Scirrhus *and* Cancer: *From* St. Hilaire. *And particularly of* Cancers: *From Meſſieurs* Gendron, Alliot *and* Helvetius. *Together with a Manuſcript Copy of* Fuchius, *in the Hands of one of the Compilers of this Work, wherein it will appear,* Gendron *and* Alliot's *Notions were known long ago. Likewiſe Mr.* Dion's *Operation practis'd on the* Cancer: *With ſome new Diſcoveries of Mr.* Beckett's, *Surgeon,* 469

A ſhort Account of the Abdomen *or Lower Belly. From Mr.* Le Clerc, *Phyſician to the* French *King,* &c. 484

Of the Peritonæum *or Rim of the Belly, and its Parts. From* Verheyen, St. Hilaire, *and others the moſt modern and accurate Anatomiſts,* 494

Of the Gullet *and* Stomach. *From* Peyerus, Malpighius, Valſalva, &c. 496

Of the Inteſtines. *From* Malpighius, Verheyen, &c. 499

Of the Meſentery, Lacteals, Thoracick Duct, *&c. To which ſome Things are ſubjoin'd concerning the* Lymphaticks *of the* Abdomen. *Taken from* Bartholin, Aſellius, Wharton, Tulpius, Veſlingius, Rudbeck, Pecquet, Van Horne, Ruyſch, Bidloo, &c. 502

Of the Pancreas. *From* De Graef, &c. 506

Of the Spleen. *From* Malpighius, &c. Page 507

Of the Liver, Gall Bladder, and Biliary Ducts. From Gliſſon, Malpighius, Verheyen, &c. 509

Of the Kidneys, &c. *From* Bellinus, 513

Of the Diſeaſes, and their Cures, belonging to the Abdomen, &c. 516

Of the Ventral Hernia *or* Rupture, 520

The Prior de Cabriere's *Medicines for* Hernia's, 521

Of the Diſeaſes of the Stomach, and their Cures, 523

Of the Diſeaſes of the Inteſtines, &c. 528

Of the Diſeaſes of the Guts, and their Cures; eſpecially of an Inteſtinal Rupture from a Relaxation of the Peritonæum. *Communicated by Mr.* Tho. Garlick, *Surgeon, at* Wolverhampton, 534

Of the Cure of the Cholera Morbus, Diarrhœa, Dyſentery, *and* Teneſmus. *Taken from Mr.* St. Hilaire's *Remedies of the Diſeaſes of Humane Bodies, the Pathology of* John Baptiſt Verduc, *Doctor of Phyſick, and others,* 536

Of Worms. From Andry, 538

Of the Iliack Paſſion. *From* Riverius, &c. 542

Of the Cure of the Colick, 542, 543

Of the Diſeaſes of the Meſentery, 545

Of the Diſeaſes of the Liver, *and their Cures,* 547

Of the Dropſy, *and its Cure,* 553

Of the Diſeaſes of the Spleen, 557

Of the Diſeaſes of the Kidneys *and* Bladder. *From* Cyprianus, Raw, St. Hilaire, Dion, &c. 560

Of Medicines proper for the Cure of the Stone *in the* Bladder *and* Kidneys, Gravel, Bloody Urine, Inflammations, *and* Ulcers *of the* Kidneys *and* Bladder, Suppreſſion *of* Urine, Dyſury, Strangury, *and* Iſchury, Diabetes, *and* Incontinence *of* Urine. *From* St. Hilaire, 567

An Account of King William's *Conſtitution, and State of Health, from his Infancy, but particularly from* 1688. *Chiefly taken from Dr.* Bidloo's *Relation of his laſt Sickneſs, and Death. Printed in* Holland. *To which are added, Several Letters from Eminent Phyſicians on that Subject,* 577

Of the Parts of the Thorax. *From* Le Clerc, Verheyen, *and* St. Hilaire, &c. 596

Of the Pleura, Mediaſtinum, &c. 599

Of the Heart, &c. 600

Of the Aſpera Arteria, *and Lungs,* 603

Of the Motion of the Heart, *and Uſe of* Reſpiration. *From* Borellus, &c. 606

Verheyen's *Examination of the Two oppoſite Opinions*

Opinions of Lower *and* Vieuſſens, *concerning the Ferment of the Heart, and the Texture of its Membranes,* Page 615
Of the Diſeaſes of the Thorax, &c. 620
Of the Quinſey, *and other Diſeaſes of the* Windpipe, 621 *to* 626
Of the Diſeaſes of the Thorax, Pleura, Mediaſtinum, &c. 627
The Cure of the Pleuriſy, &c. 629
Of the Diſeaſes of the Lungs, 631
Of the Aſthma. *From* Bartholet, Floyer, &c. 634
An Anatomical Hiſtory of the Brain; *communicated by Mr.* F. Poupart *to Mr.* Le Clerc, *Phyſician to the* French *King,* 639
Of the Method of Diſſecting the Brain. *From the ſame Author,* Page 644
Of the containing Parts of the Head. *From* Verheyen, 649
Of the Brain. *From the ſame Author,* 650
Of the Diſeaſes of the Head, *and their Cures. From* Michaelis, Willis, St. Hilaire, Cole, &c. 660
Of the particular Cure of the Polypus, Ozæna, &c. *From* Dion, 674
Of the Hydrocephalum, 678
Of the Alopecia, *&c.* 679
Of the Phrenzy, Ibid.
Madneſs and Melancholy, &c. 680

An ACCOUNT of the *CUTS*, and the Pages where to find them.

PLATE I.

Figure 1. *Repreſents all the Muſcles of the Fore-Part of the Trunk of the Body. Out of* St. Hilaire, Page 73
Fig. 2. *The Hind-Part. From* St. Hilaire, Ibid.
Fig. 3. *The Fore-Part of the Humane* Penis, *prepar'd with Mercury,* 137
Fig. 4. *The two* Corpora Cavernoſa Penis, *and that of the Urinary Paſſage, after a tranſverſe Section, when inflated and dry'd,* Ib.
Fig. 5. *Shows the Back-Part of the Humane* Penis, 138
Fig. 6. *The internal Parts of the Extremities of the two* Corpora Cavernoſa, *and that of the Glands of the* Penis, Ibid.
Fig. 7. *The Bulb of the* Corpus Cavernoſum *of the* Urethra, *being dry'd after Inflation,* Id.
Fig. 8. *Part of one of the* Corpora Cavernoſa *of the* Penis, *being likewiſe dry'd after Inflation,* Ibid.
Fig. 9. *Exhibits the Bulb of a Dog's* Penis, *after Inflation,* Ibid.

PLATE II.

Fig. 10. *Muſcles of the Fore-Part of the Head,* 139
Fig. 11. *Muſcles of the Eye,* Ibid.
Fig. 12. *Muſcles of the Ear,* &c. Ibid.
Fig. 13. *Muſcles of the* Os Hyoides *and Jaws,* 140
Fig. 14. *Muſcles of the Tongue,* Ibid.
Fig. 15. *Muſcles of the* Larynx, Ibid.
Fig. 16. Vaginalis Gulæ, 141
Fig. 17. *Muſcles of the Hind-Part of the Head and Neck,* Ibid.
Fig. 18. *Muſcles of the* Gargareon, Page 141

PLATE III.

Tab. I. Fig. 1. *The Auricle with the new Glands,* Tragus, *and the* Parotid *Gland, with its Duct and the Lymphatick, ſome of which have not been delineated before,* 216
Fig. 2. *The Auricle and the Cartilage,* Ibid.
Fig. 3. *The external Muſcles of the Auricle,* Ibid.
Fig. 4. *The internal Muſcles,* 217
Tab. II. *The Auricle expreſs'd after ſuch a Manner, that the Courſe of the Nerves, Veins, and Arteries, come all in View at once,* Ibid.
Tab. III. Fig. 1. *Shows the Auricle, with the Auditory Paſſage, from the hinder Part,* Ibid.
Fig. 2. *The Glands of the reticular Body ſeparated from the* Meatus, Ibid.
Fig. 3. *The Membrane of the* Tympanum, *the* Chorda, *the* Incus, *the* Malleus, *and* Euſtathius's Tube, 218
Fig. 4. *The* Malleus *and its Proceſs,* Ibid.
Fig. 5. *The* Malleus *and its Muſcles,* Ibid.
Fig. 6. *The* Incus, *and that call'd* Os Orbiculare, Ibid.
Fig. 7. *The* Malleus, Incus *and* Os Orbiculare *altogether,* Ibid.
Fig. 8. *The* Stapes *and Orbicular Bone, the* Baſis *of the* Stapes, &c. Ibid.
Fig. 9. *The* Stirrop *and Membrane by which the Baſis is bound about the* Feneſtra Ovalis, 219
Fig. 10. *The* Stirrop *with the Orbicular Bone,* Id.

Fig. 11.

Fig. 11. *Repreſents all the little Bones in Order*, Page 219
Fig. 12. *Shows the new Muſcle of* Euſtathius's *Tube*, Ibid.
Fig. 13. *Explains the Cartilage of* Euſtathius's *Tube turn'd Inſide out*, Ibid.
Fig. 14. *Repreſents* Euſtathius's *Tube ſeen from the back Part*, Ibid.
Tab. IV. *Expreſſes the outward Site or Appearance of the Baſis of the hairy Scalp, the fore Part being rais'd ſo that* Euſtathius's *Tube, the new Muſcle and other Parts, may all in their due Poſitions be expos'd to the naked Eye*, Ibid.

PLATE IV.

Tab. V. Fig. 1. *Expreſſes the fore Part of the* Uvula, *with its Muſcles*, 227
Fig. 2. *The fore Part of the* Larynx, *with its Orifices and Muſcle*, Ibid.
Tab. VI. *The* Larynx *and all its Muſcles, according to the back Part*, Ibid.
Tab. VII. Fig. 1. *Part of the Carotid Artery. From* Valſalva, 228
Fig. 2. *The lower Part of the Right lateral* Sinus *of the* Dura Mater, *with* Willis's Diverticulum, Ibid.
Fig. 3. *The whole Progreſs of the* Portio Dura *of the Pair of Auditory Nerves*, Ibid.
Fig. 4. *The bony Channels thro' which the Auditory Nerves run*, 229
Fig. 5. *The Channels of the Auditory Nerves, with ſeveral Parts of the Ear*, Ibid.
Tab. VIII. Fig. 1. *The ſemicircular Channels*, Ibid.
Fig. 2. *The whole Cavity of the Labyrinth*, Id.
Fig. 3. *The ſemicircular Channels ſtretch'd out lengthways*, Ibid.
Fig. 4. *The whole Labyrinth turn'd inſide out, towards the* Tympanum, Ibid.
Fig. 5. *The Labyrinth towards the* Cerebrum, 230
Fig. 6. *The Two Scales of the* Cochlea, *their Courſe and Orifices*, Ibid.
Fig. 7. *The* Septum *of the* Cochlea, Ibid.
Fig. 8. *The* Portio Mollis *of the Auditory Nerves, with all the Zones of Sound*, Ibid.
Fig. 9. *The ſame as the former Figure, but in an oppoſite View*, Ibid.
Fig. 10. *The* Portio Mollis, *and Blood Veſſels*, Id.
Fig. 11. *The* Portio Mollis, *with the* Portio Dura, 231
Tab. IX. Fig. 1. *The fore Part of the Ear, ſo expreſs'd, that the four little Bones may appear in Sight*, Ibid.
Fig. 2. *The hind Part of the Ear, ſo expreſs'd, that the* Feneſtra rotunda, *the Membrane of the* Tympanum, *and Part of the Four little Bones may be ſeen*, Page 231
Fig. 3. *The Membrane of the* Veſtibulum, &c. 232

PLATE V.

Fig. 8. *Of* Sutures, 275
Fig. 33. *For the Eyelids*, 278
Fig. 34. *For the Eye-laſhes*, 280
Fig. 35. *For the* Tunicles *of the Eyes*, 281
Fig. 36. *For the Corners of the Eyes*, 284
Fig. 39. *For the Hare-lip*, 293
Fig. 41. *For the Tongue and* Uvula, 289
Fig. 42. *For the Ears, and Parts adjacent*, 287

PLATE VI.

Fig. 45. *For the* Suture *of the Tendon*, 351
Fig. 53. *Application of the* Seton, 356
Fig. 54. *Opening of an Abſceſs*, 357
Fig. 55. *For Enkyſtated Tumours*, 361
Fig. 56. *Cauteries, Iſſues*, &c. 363
Fig. 57. *For Cupping*, 365
Fig. 58. *Leaches, Bliſters*, &c. 367

PLATE VII.

Fig. 1. *The Trunk and large Branches of the Arteries diſſected from a Humane Body*, 410
Fig. 2. *The Trunks and Ramifications of the Arteries fill'd with Wax*, 412
Fig. 3. *One of the Trunks of the Arteries of the* Tibia, *diſſected from the Leg after Amputation*, 413
Fig. 4. *The Extremities of the Blood Veſſels, while the Blood is paſſing them in the* Omentum *of a live Dog, view'd with a Microſcope*, 414
Fig. 5. *The like appearing in the Meſentery of a Dog when living*, Ibid.

PLATE VIII.

Fig. 6. *The Trunks of the* Vena Cava *with their Branches diſſected*, Ibid.
Fig. 7. *Some of the large Trunks of the Veins and their* Sinus's *within the Skull, with the Beginnings of the internal* Jugulars, 415
Fig. 8. *The Trunks of the* Vena Porta *diſſected and diſplay'd*, Ibid.

PLATE IX.

Tab. I. Fig. 1. *Shows the new Lymphaticks in a Dog diſſected*, 451
Fig. 2. *The Lacteals, Pancreas, and other Glands. From* Rudbeck, Ibid.
Fig. 3. *Several Veſſels relating to the ſame Parts*, 452
Fig. 4. *Shows the Forking of the Chyliferous Duct under the Heart*, Ibid.

Fig. 5.

The CONTENTS.

Fig. 5. *The Axillary Vein, with the Left Jugular,* Page 452
Fig. 6. *A different Ramification of the Chyliferous Duct,* Ibid.
Fig. 7. *The Gullet, Gland, and Chyliferous Duct,* 453
Fig. 8. *The Lungs join'd to the Heart, some Parts of the* Vena Cava *and* Aorta, Ibid.
Fig. 9. *The Lobes of the Lungs in a Dog, with ſerous Veſſels,* Ibid.
Tab. II. Fig. 1. *Shows the Lymphaticks cut behind, ſideways and lengthways, with their Valves,* Ibid.
Fig. 2. *A Horſe's Liver from the concave Part, with the Lymphatick Veſſels, and their Valves,* Ibid.
Fig. 3. *The Lacteals in a Horſe of the firſt and ſecond Kind, Part of the Glands of the Meſentery, and the Receptacle of the Chyle,* 454
Fig. 4. *A Lacteal Vein, with its Valves,* Ibid.
Fig. 5. *Part of the Thoracick Duct of a Horſe, with the Valves in Sight,* Ibid.
Fig. 6. *The Spleen with its Lymphaticks and Blood Veſſels tied,* Ibid.

PLATE X.

Tab. I. Fig. 1. *Part of the* Cuticula *rais'd from the true Skin, as it appears by a Microſcope,* 488
Fig. 2. *The* Abdomen *open to ſhow its* Viſcera, Ibid.
Fig. 3. *The Cavity of the* Abdomen *after its Muſcles and* Peritonæum *are remov'd,* Id.
Fig. 4. *The Stomach revers'd. From* Bidloo, 489
Tab. II. Fig. 1. *The Caul of a young Dog with its Veſſels,* Ibid.
Fig. 2. *The Stomach, with the Guts adjoining,* 490
Fig. 3. *The double Worm-like Proceſs,* Ibid.
Fig. 4. *The external Order of the Fibres of the ſecond Tunicle of the Stomach,* Ibid.
Fig. 5. *The internal Order of the Fibres,* Ibid.
Fig. 6. *Part of the Vaſculous Coat,* Ibid.
Fig. 7. *Part of the Glandulous Coat,* Ibid.
Fig. 8. *The Stomach inverted, ſo that the Wrinkles or Folds may appear within,* Ibid.
Tab. III. Fig. 1. *The Coats, Glands, and Valves of the Inteſtines,* Ibid.
Fig. 2. *Part of the* Jejunum *laid open,* 491
Fig. 3. *Part of the great Gut as well as ſmall,* Id.
Fig. 4. *The* Abdomen *laid open,* Ibid.
Fig. 5. *The Meſentery, with the Guts,* Ibid.
Tab. IV. Fig. 1. *The hollow Part of the Liver revers'd,* Ibid.
Fig. 2. *The concave Part of the Spleen,* Page 492
Fig. 3. *The Trunk of the Great Artery and* Vena Cava, Ibid.
Fig. 4. *Part of the Liver boil'd and view'd by a Microſcope,* Ibid.
Fig. 5. *The Kidneys diſſected,* 493
Fig. 6. *The Veſſels of the Kidneys,* Pelvis, *and Urinous Ducts,* Ibid.
Fig. 7. *The whole Kidney divided from its gibbous Part to the* Pelvis, Ibid.
Fig. 8. *The Blood Veſſels and Urinary Tubes of the Kidney, expreſs'd from a Microſcope,* Ibid.

PLATE XI.

Tab. I. Fig. 1. *Of the Breaſt and Diaphragm,* 570
Fig. 2. *The Breaſt freed from its Integuments,* Ibid.
Fig. 3. *Part of the Nipple view'd with a Microſcope,* Ibid.
Fig. 4. *Part of the Breaſt, with the Nipple,* Ibid.
Tab. II. Fig. 1. *The Breaſt open'd on the Right Side,* 571
Fig. 2. *The whole Breaſt open'd,* Ibid.
Fig. 3. *The Heart taken from the Body, and the Lungs with the Blood Veſſels joining to it,* Ibid.
Fig. 4. *The Heart cut through both Ventricles lengthways,* Ibid.
Fig. 5. *Part of the Artery that opens into the Cavity of the Heart, that the Semilunar Valves may appear.* 572
Tab. III. Fig. 1. *The Left Ventricle of the Heart laid open,* Ibid.
Fig. 2. *The Left Auricle open'd,* Ibid.
Fig. 3. *The Beginning of the* Aorta *laid open,* Ibid.
Fig. 4. *The Form and Structure of the Valves in the Arteries,* Ibid.
Fig. 5. *The Baſis of the Heart ſo diſſected, that the Mouths of the Veſſels may appear,* 573
Fig. 6. *Straight Fibres in the Right Ventricle,* Ibid.
Fig. 7. *The Spiral Ducts of the Fibres of the Heart,* Ibid.
Fig. 8. *The longer Fibres twiſted in the Cone of the Heart,* Ibid.
Fig. 9. *The Fibres twiſted in the Cone, and here expanded,* Ibid.
Fig. 10. *The Fibres ſtretch'd from one external Side to the other, before they reach the Cone,* Ibid.

Fig. 11,

Fig. 11, and 12. *Are to demonſtrate the Paſſage of the Blood in a* Fœtus, *by a Lamb's Heart,* Page 573
Tab. IV. Fig. 1. *The Heart ſo plac'd as to ſhow the Left Side, and the Veins diſtributed thro' the Left Auricle,* 574
Fig. 2. *The Heart plac'd to ſhow the Right Side,* Ibid.
Fig. 3. *The Right Ventricle and Auricle, with the ſuperior* Vena Cava, Ibid.
Fig. 4. *Part of the Lungs dry'd,* &c. Ibid.
Fig. 5. *The Bronchial Glands of the Wind-pipe,* 575
Tab. V. Fig. 1. *The Lungs with the Wind-pipe, taken from the Body,* Ibid.
Fig. 2. *The fore Part of the Cartilages of the* Larynx *in Sight,* Ibid.
Fig. 3. *The hind Part in Sight,* Ibid.
Fig. 4. *The convex Side of the* Epiglottis *ſeparated from the reſt,* Ibid.
Fig. 5, *and* 6. *The Artænoide Cartilages,* 576
Fig. 7. *The Face of the Cricoide Cartilage,* Id.
Fig. 8. *The back Part of the ſame,* Ibid.
Fig. 9. *The Muſcles of the* Larynx *in the hind Part,* Ibid.
Fig. 10. *The Side Muſcles of the* Larynx, Ibid.
Fig. 11, 12, 13, *and* 14. *Regard the Glandulous and Membranous Coats of the* Aſpera Arteria, Ibid.
Fig. 15. *The poſterior Head of the* Larynx *cut in the Middle lengthways, and expanded, that the interior Parts may appear,* Ibid.

PLATE XII.

Tab. VI. Fig. 1. *The great Lobe of a Sheep's Lungs,* 652
Fig. 2. *The mutual Union of the* Bronchia, &c. Ibid.
Fig. 3. *A Branch of the Pulmonary Nerve,* Ibid.
Fig. 4. *The Muſcles and Coats of the* Oeſophagus, Ibid.
Fig. 5. *The internal and hairy Superficies of the Gullet,* Ibid.
Fig. 6. *The Muſculous Coat of the Gullet, from the fore Part of an Ox,* Ibid.
Fig. 7. *The ſame Coat from the hind Part,* Ibid.
Tab. VII. Fig. 1. *The Head, where the* Cranium, *and great Part of the* Meninges, *are taken away,* 653
Fig. 2. *The* Sinus *of the hard* Meninges, &c. Ibid.
Fig. 3. *The lower Part of the* Cerebrum *taken from the upper,* Page 653
Fig. 4. *The whole Bulk of the Brain taken out of the Skull and inverted,* 654
Fig. 5. *The Baſis of the Skull,* Ibid.
Fig. 6. *The Subſtance of the Brain, ſeen by a Microſcope,* Ibid.
Fig. 7. *Part of the Hair view'd by a Microſcope,* Ibid.
Fig. 8. *The Multiplicity of Veſſels in a Hair,* Ibid.
Tab. VIII. Fig. 1. *The Fornix of the Brain,* 655
Fig. 2. *The Brain, with the* Fornix *and* Choroide Plexus *remov'd,* Ibid.
Fig. 3. *The Medullary* Striæ *ſhown in the Baſis of a Sheep's Brain,* Ibid.
Fig. 4. *The fourth* Sinus *with the* Choroide Plexus, 656
Tab. IX. Fig. 1. *The Nerves ſhown in the* Spinal Marrow, Ibid.
Fig. 2. *A Dog's Brain cut croſſways,* Ibid.
Fig. 3. *The Vertebral Arteries, and their Branches in the back Region of the* Medulla Oblongata, Ibid.
Fig. 4. *The Vertebral Veins and* Sinus's, 657
Fig. 5. *The Spinal Arteries,* Ibid.
Tab. X. Fig. 1. *Part of the Trunk of a Humane Body,* Ibid.
Fig. 2. *The ſame as the firſt, only the Arm bent,* Ibid.
Fig. 3. *Some Muſcles with which the Elbow is bent and the Arm extended,* 658
Fig. 4. *Connexion of the Bones of the Arm,* Ibid.
Fig. 5. *Demonſtrate mechanically, that a ſmall Motion about the Center, makes a great one in the Circumference,* Ibid.
Fig. 6. *Several Fibres of the Muſcles,* Ibid.
Fig. 7. *A few Fibres from the aforeſaid Muſcles,* 659
Fig. 8. *A Pair of Bellows, in which is incloſ'd a Sheep's Lungs, where the* Aſpera Arteria *is fix'd to the Neck thereof,* Ibid.
Fig. 9. *A Bow reſting upon a Plain, both Ends whereof are turn'd into a fix'd Handle,* Ibid.
Fig. 10, *and* 11. *Part of the* Thorax, *with the Ribs and Intercoſtal Muſcles,* Ibid.
Fig. 12. *A Pair of Bellows, having a Hole in the Belly, to which is fix'd the Mouth of a large Bladder, that flags or grows lank when the Bellows take in Air.* Ibid.

THE

THE INTRODUCTION OF *Lyſerus's Culter Anatomicus.*

SECTION I.

Of the Subject of Anatomy.

ANATOMY ſeems in our Age (quite otherwiſe than what it was formerly) to be the only and moſt proper Object of thoſe that apply themſelves to the Study of Phyſick: For as theſe, in all their Operations, aim at nothing elſe but the Support and Preſervation of *Humane Bodies*; ſo they make them, with an unanimous Conſent, the true and proper Subject of *Anatomical Diſſections*; by which alone they endeavour to get a true Inſight and Knowledge of the natural Situation, Connexion, Figure and Magnitude of thoſe ſeveral Parts that compoſe this moſt miraculous Frame. 'Tis true, the Diſſections of *Brutes* do ſtand us in no ſmall Stead in Reference to the *Uſe of their Parts*, eſpecially if they be performed upon living Creatures (of which *Galen* tells us he has diſſected no leſs than 600). But, after all, no Inference can be made from thence as if they were the true Object of *Anatomy*, becauſe the Diſſection of *Brutes* is only accidental; and therefore can't be looked upon as the true and proper Subject of *Anatomy*, unleſs it be taken in a general Signification, *viz.* as far as *Anatomy* has a near Relation to *Natural Philoſophy*. But this laſt being beyond the Extent of my Province at this Time, I will confine my ſelf to that which appertains in a moſt peculiar Manner to Phyſicians; and therefore will now begin to give you ſome few Directions relating to the Choice of thoſe humane Bodies that are the moſt proper Subject of *Anatomy*, if it be in your Power to obtain them.

Humane Bodies, generally ſpeaking, are either in a good State of Health, or elſe affected with Diſeaſes. The firſt are the moſt proper for our Purpoſe; I mean, the Scrutiny of the *natural Conſtitution* of thoſe Parts that compoſe our Body, and therefore ought to be of ſuch Perſons as have ſuffered a violent Death; among which, thoſe that have been hanged, or loſt their Lives by Strangulations with a Cord, are the moſt proper, and to be preferred before the reſt. 'Tis for that Reaſon that *Riolan* rejects thoſe dead Carcaſſes that have been ſuffocated in the Water as improper for *Anatomy*, though *Galen* uſed moſt frequently to drown ſuch of his living Creatures as he had choſen for his

Anatomical Operations. And truly I can't but wiſh with Mr. *William Fabricius*, that we had more frequent Opportunities than actually we have of inſpecting the dead Carcaſſes of ſuch as have died by a violent Death, ſince the ſame would turn to the ſignal Benefit and Advantage as well of the Patient as the Phyſician.

But there are, beſides this, divers other Differences to be obſerved in humane Bodies; *viz.* in Reference to their Sex, Age, Quantity, and Qualities.

In Relation to the Difference of the Sex, the Diſſection of Males, as well as Females, muſt be taken in Hand, to ſhew the Difference of the Sex, and the Conſtruction of their *Genital Parts*. The Diſſections of big-bellied Women, even if they happen to die by Diſtempers, have alſo their peculiar Uſe.

In Reference to the Difference of Age, the dead Carcaſſes of young Men, dying in the Flower of their Age are the moſt proper Objects of *Anatomy*; for they are not ſo much abounding with Moiſture as thoſe of Children are, nor ſo much emaciated and deſtitute of Blood as Perſons of a decrepid Age. However, there is a Neceſſity alſo ſometimes to anatomize Children, to inveſtigate the Difference betwixt them and Perſons of riper Year: Nay, the very *Embryo* brought forth by *Abortions* is alſo a convenient Subject of *Anatomical* Diſſections.

In Regard to the *Quantity*, we ought to pitch upon large and bulky Carkaſſes, becauſe in theſe the leſſer Parts, of which there is ſo vaſt a Number in our Bodies, will be the more conſpicuous and apparent to our Eyes; it being a general Rule, That the leſſer Parts are anſwerable in Proportion to the great Ones.

In Reference to their Qualifications, a due Regard muſt be had either to *Fat* or *Lean* Bodies. For my Part, I would rather chooſe a leaniſh than a fat one, provided it be not quite emaciated, and deſtitute of all its natural Juice; for if the Body be over-fat, this *Fat* occaſions many Obſtacles and Difficulties in the Operation, which is ſufficiently obvious to thoſe that have been preſent at, or had the Management of Anatomical Preparations of the *Uterine Veſſels* in fat Women.

To ſpeak in a few Words what I have repreſented to you before, concerning the Subject of Anatomy, I look upon a young, luſty, and ſound Body, ſuch like as is neither too lean nor too fat, to be the moſt proper Subject of *Anatomical* Operations.

SECT. II.

Of the Anatomical *Inſtruments.*

AFter having made a good Choice of the Body, Care muſt alſo be taken to furniſh your ſelf with ſuch Inſtruments as are neceſſary to perform theſe *Anatomical* Operations. Theſe are of two Sorts; *viz.* ſome for neceſſary Uſe, others for Shew only, or Ornament's Sake. We intend to treat only of the firſt, without meddling with the laſt at this Time. The neceſſary Inſtruments are, according to my Computation, of Twelve ſeveral Sorts; *viz.* the *Needle*, *Thread*, *Diſſecting Knives*, *Small Hooks*, a *Whetſtone*, a *Spunge*, a *Pair of Sciſſars*, a *Style*, a *Small hollow Pipe*, a *Pair of Small Bellows*, a *Saw*, and an *Elevatory*.

(1.) Before you enter upon the Diſſection it ſelf, you muſt have Recourſe to your *Needle*. This, for your better Conveniency, ought to be double-edged, like a Shoemaker's Knife, which will penetrate the Skin with more Facility than the reſt. Some I know have a Way of putting the Needle-Caſe juſt oppoſite to that Place of the Skin where they intend to ſtick in the Needle, by this Means to prevent the Skin from giving Way to the Needle, and conſequently to further its Penetration thro' the Skin.

(2.) Neither muſt you be without Thread, which, to ſtrengthen it the more, and render it fit for the making of your *Ligatures*, muſt be drawn thro' Wax. How theſe *Ligatures* are to be made, is ſufficiently known. Nevertheleſs thus much may be added, that thoſe *Veſſels* and *Ducts* or *Paſſages* which are the moſt proper Objects of theſe *Ligatures*, being ſlippery on the outſide, and conſequently very apt to let the Thread ſlip off. To Remedy this Inconveniency, you muſt draw your *Needle* and Thread thro' the very Subſtance of theſe *Veſſels* or *Ducts*, and afterward tie them up by winding the Thread about them.

them. This is peculiarly obſervable, and of great Uſe, in the Ligatures of the *Trunk* of the *Cava* ariſing out of the *Liver*.

(3.) Your Diſſecting Knives muſt be made of the beſt Steel, as ſharp as the niceſt Raſors. Of theſe they have invented divers Sorts; whereas, in my Opinion, two Sorts are ſufficient to anſwer all the Ends for which they are intended, *viz.* that called *Myrteum* by *Galen*, becauſe it reſembles in Shape the *Myrtle Leaf*, and the *Exciſorium*, or *Diſſecting Knife*. If the firſt be very ſmall and taper, it comes under the Denomination of a *Gladiolus*, *i e.* a *Small Sword*. The *Exciſorium*, called Ἐγκοπεὺς by the *Greeks*, is a *Knife*, the Point or fore Part whereof is crooked, like the Beak of a Hawk; whence it is often ſtyled the *Crooked Knife*. In the Operations made on the Head, you muſt be provided with a larger Knife of about two Palms Length, and an Inch in Breadth. We have given it hereafter the Name of the *Broad Raſor*. I know ſome, who, to make the Knife enter the more ſteady and firm, put the middle Finger underneath it, and upon that Account make uſe of an Iron Plate of a ſemicircular Figure, to preſerve your Finger.

Every one is at Liberty to chooſe what Handles he thinks fitteſt for theſe Knives.

(4.) When you are to take up or lay hold of any Thing, you muſt do it by the Help of ſome ſmall Hooks. Theſe are of two Sorts, *viz.* ſuch as have two Points like our ordinary Forks, but that theſe are bent or crooked at both Points; or ſuch as have but one crooked Point or Extremity.

(5.) You will ſtand in Need of a Whetſtone to ſharpen the Edges of your Knives upon. You may alſo make Uſe of a Piece of Leather, ſuch as the Barbers cleanſe and ſharpen their Raſors upon.

(6.) You muſt have a *Spunge* at Hand, in order to wipe off and dry up the Excrements, and ſuch other Moiſtures as you ſee to come forth along with the Blood.

(7.) You muſt make Uſe alſo of certain ſolid *Styles*, like round Bodkins, called by ſome *Spicilla*, and *Oricultaria*, and by ſome of the Interpreters of *Galen*, erroneouſly, *Plates*, to find out the Paſſages and Extent of the *Veſſels*; and as theſe vary much in Bigneſs, ſo you muſt be provided with *Styles* or Probes of different Sizes: But take Care they be very ſmooth, and at the Extremity they muſt have a round Point or Head of a ſmall globular Figure. They are made either of Silver, Iron, Steel, Tin, and ſometimes alſo of *Box* Wood.

(8.) The *Sciſſars* are made uſe of to cut in Pieces the *Membranes*, and therefore thoſe that are intended for the Diſſections of the *Tunicks* of the *Eyes* muſt be very fine, ſmall, and ſharp pointed.

(9.) The *Tubulus* or *hollow Pipe* is abſolutely requiſite and uſeful for the Opening of the *Ducts*, either by blowing into them, or by making Injections of Liquids, in order to find out the Extent and Openings of the ſeveral Paſſages. The Extremity which is to be inſerted into the *Ducts* muſt not be very big, and a little bent; but that which is to be put to the Mouth may be ſomewhat larger. You muſt be provided alſo with ſeveral other ſtrait Pipes, in order to put them, as Occaſion requires, within the Orifice of another; the Length whereof muſt be left to your own Diſcretion.

(10.) You will ſtand in Need alſo of a Pair of *Bellows*, to extend and blow up certain Parts belonging to humane Bodies; and ſince every Body knows what *Bellows* are, we may well omit to give a Deſcription of them.

(11.) When you are to open the *Cranium*, it muſt be done by the Help of a *Saw*; ſuch a one as our Chirurgeons make uſe of in their Amputations of a gangrenous Member. It muſt be made of the beſt Steel, and the leſſer the better, provided it be ſtrong enough for the Operation.

(12.) The laſt among theſe Inſtruments is the *Elevatorium*, which ſerves for the lifting up or raiſing the *Cranium* or Skull after it has been cut aſunder by the *Saw*. It matters not what Figure it is of, provided it be ſo contrived that it may penetrate into the Opening of the *Cranium*, in order to pull off the Skull, which, even after its being cut aſunder by the *Saw*, will ſtick very cloſe and hard to the *Dura Mater*.

SECT. III.

Some General Rules to be obſerved in Diſſections. From the ſame Author.

I Would have no Body to be admitted to Diſſections, except ſuch as have applied themſelves to the Study of *Phyſick* or *Chirurgery*: And even in this Reſpect you will not find me quite ſo rigorous as *Riolanus* is, who excludes alſo the young Students of *Phyſick*, but eſpecially the young Beginners, from theſe Operations: For, ſays he, if they happen to prove tedious and difficult, this may induce them to quit their Studies. But this being a Thing in my Opinion very unbecoming the Character of a Student in Phyſick, who by his indefatigable Labour and Induſtry ought to endeavour to raiſe his Knowledge to the utmoſt Pitch, I muſt needs allow a Place to the Students of *Phyſick* and *Chirurgery*; but would have no Body elſe to be admitted among them. The firſt muſt be preſent, to be inſtructed in *Anatomy*, and the *Art of Diſſecting*; but the latter to be excluded, to prevent their carping upon and traducing the Operations of the *Anatomiſts*: For to perform it in ſuch a Manner as to expect the Approbation of all, is pretending to an Impoſſibility.

The beſt Time for *Anatomical* Operations is the Winter, becauſe the dead Carkaſſes keep much longer in the cold Seaſon, but ſoon putrify in hot Weather. *If it ſo happen*, ſays *Riolanus*, *that you meet with an Opportunity of Diſſecting a Female Body in the Summer, which as it is not very frequent, ſo it muſt not be refuſed at any Time. To prevent its ſudden Corruption and Putrefaction, let it be laid during the Diſſection upon* Periwincle, *or* Water Garmandel; *and when that is done, to be covered all over with the ſame Herbs. You muſt alſo waſh the internal Parts either with Water and Salt, or elſe with Brandy, and depoſite the Body in the Night in ſome Vault or ſubterraneous Place.*

The firſt Thing to be done, is to cleanſe the Body of all Impurities; Cleanlineſs being very commendable in all Reſpects, without which the Diſſection will prove both nauſeous and tedious to the Spectators: For, as *Riolan* well obſerves, *Anatomical Operations* will be found more acceptable and uſeful if performed or managed by a clean and dextrous Hand. The ſame *Riolan* adviſes alſo, to take off the Hairs of the Body, becauſe they are apt to blunt and ſpoil the keen Edges of the Knives.

Theſe Operations ought to be performed in the Cold, and therefore it will be ſufficient in the Winter Seaſon for the Anatomiſt to warm his Hands over a Fire-pan, but to ſuffer no other Fire to be made in the ſame Room; for a warm Hand will ſoon reduce the rigid Members to their own Station.

Be ſure to pitch upon a Room where there is a very good Light for theſe Operations, without which, you will never be able to take an exact View of thoſe ſmall Parts in our Body, which are ſcarce diſcernable but by a very quick Eye. I know it to be a Cuſtom with ſome to make their *Diſſections* in a darkiſh Room, and to prefer the Light of Candles to the Luſtre of the Sun: But I am of a contrary Opinion, and therefore adviſe you to do it by the Sun Light, and lay your Body intended for the Diſſection upon a Table that will turn round with Eaſe, that ſo you may with the more Conveniency turn every Part of it to the Light as Occaſion ſhall require. In publick *Anatomies* ſuch a Table is abſolutely requiſite, that every one of the Spectators that ſtand round about it in a Circle may have the Opportunity of viewing what is propoſed by the *Anatomiſt*.

Let your Hand be kept in Suſpenſe whilſt you are performing the *Diſſection*, by which Means you will be able to perform it with more Safety and Conveniency than when your Hand reſts upon the Body, you being more at Liberty to guide your Hand at Pleaſure, and to apply it the better to the *Midling Section*. I call that a *Midling Section*, when your *Diſſection* or *Opening* penetrates no further than into that Part which is to be diſſected, without touching or impairing the ſubjacent Parts.

Under the Name of theſe *Sections*, muſt alſo be comprehended that *Separation* performed κατα ἀφαιρεσιν, *i. e.* by Way of *Excoriation*, as the *Latins* expreſs it, whereof frequent Mention will be made hereafter in this Treatiſe. What this *Separation* is, will be beſt underſtood

ſtood from the following Paſſage of *Galen*. *The true Subject of* Excoriation, *or Things to be ſeparated* κατὰ Διάρσιν, *are, when theſe Parts are compoſed of a Contexture of very ſmall and numerous Filaments, as ſubtil as our common Cobwebs. Now theſe ſmall Particles may indeed eaſily be ſeparated by our Fingers only; nevertheleſs it will be much more proper in your Diſſections to ſeparate them by the Knife; ſo that you may be able to diſcern with your Eye what you are about; which is not ſo, if you do it by the Help of your Fingers only when the Compoſition of the Parts is rendered undiſcernable to the Eye. Wherefore it will be much better to divide and ſeparate them from the ſubjacent Parts by the Help of the Knife.*

You muſt frequently wipe off the liquid Subſtance with a Spunge, becauſe it is very troubleſome; and if we may rely upon *Galen*, nothing does ſo much diſturb the whole manual Operation in the Diſſections of humane Bodies as the Conflux of the Blood, and ſome other Humours. If it happen that by Miſchance you cut one of the greater Veins, which will be followed by a continual Iſſue of Blood, you muſt endeavour to ſtop it by a Ligature of the Vein. If in the Diſſection of a living Creature you happen to wound a Vein, *Riolan*, after *Galen*, adviſes you to cut it quite aſunder, becauſe he ſuppoſes that both the Extremities will contract themſelves backward within the Subſtance of the Fleſh, and ſo the Orifices will be ſtop'd up: But I much queſtion the Truth of this Aſſertion, which will ſcarce ſucceed, eſpecially in your larger *Arteries*, in which the Motion of the Blood being more violent, it will open its Way where-ever it finds a Paſſage.

After you have finiſhed your firſt Day's Work, you muſt be careful to cover up the dead Carkaſs: For it being impoſſible to accompliſh the whole *Anatomy* of a humane Body in one Day, it will be requiſite that, after you have left off, you put all the Parts that are as yet coherent to the Body in their proper Places. Such Veſſels as are ſeparated from it, you muſt cover either with a Piece of the Fleſh, or a wet Spunge, to keep them from drying tôo much; then lay the *Fat* over it, and over that the *Skin*. But the Inſide of the *Skin*, as well as the *Fat*, being ſlippery, they will be apt to give Way: To prevent which, you may draw together and faſten the Extremities by the Help of a Needle and Thread; which done, put a Linen Cloth loſe over it, ſo as that the whole Carkaſs be well covered, and kept from the Air.

When you are to begin your Diſſection again, cut off the Ligatures, and lay open the Skin, Fat, and other Parts, till you have a free Acceſs to that where you left off before.

LIB. I.

Of the *Abdomen*, or Region of the Belly. From the *Culter Anatomicus* of *Lyſerus*.

CHAP. I.

How to manage the Cuticula *or thin Skin, the* Skin *it ſelf, as alſo the* Fat, *and* Carneous Membrane, *in Anatomical Diſſections.*

IN the following Method I am a going to preſcribe to you relating to *Anatomical Operations*, I would have my Reader follow the Footſteps of our Modern *Anatomiſts*, and begin their *Diſſections* at the *Abdomen* and its exterior Parts. The firſt of theſe that offers it ſelf to our View is the *Cuticula*, or *thin Skin*, called Ἐπιδερμοὶς by the *Greeks*, which being very hardly to be ſeparated by the *Anatomical Knife*, the *Anatomiſts* content themſelves with ſhewing only a ſmall Part of it to the Spectators, becauſe it would be uſeleſs to ſeparate the whole. *Riolan* adviſes us to put our Hand underneath the *Cutis* or *Skin* after it has been cut from the Fleſh, and then, by making a gentle Impreſſion with the Knife, ſeparate a ſmall Part of the *Cuticula*. But the ſame Operation might be performed whilſt the Skin was remaining as yet on the Body, tho' perhaps not without great Difficulty: For to confeſs the Truth, this Way proves exceeding difficult, if not altogether impracticable.

However, there are not wanting other Methods by which the *Cuticula* may be ſeparated, ſo as to be expoſed to the Sight. *Riolan* ſays, we muſt kindle a great Fire, and make uſe of a Wax Candle, which will burn and raiſe this *thin Skin* into *Bliſters*. This is an eaſy Operation, juſt as we ſee in Burnings occaſioned by Gunpowder or Fire;

a conſiderable Part of this *Cuticula* is to be ſeparated from the *Cutis*.

The ſame Thing may be performed by the Effuſion of hot Water, which divides and ſeparates this *thin Skin* from the *Skin* it ſelf in a moſt commodious Manner. Or elſe you may take a Piece of the *Skin* ſeparated from the Body, and dip it in boiling Water, which done, you may ſhave off the *thin Skin* with the Back-ſide of your *Knife*, and thus fulfil your Operation in a ſhort Time. Sharp and corroding Liquors anſwer the ſame End. Thus we ſee this *Cuticula* to be ſeparated in ſuch Ulcers and Tumours as owe their Riſe to corroding ſharp Humours. And in the ſame Manner it is performed in the Dreſſing of Skins; for I have obſerved them to have taken off either the greatest Part, or perhaps the whole *Cuticula*, becauſe the *Allum* and *Salt* uſed in the Dreſſing of *Skins* abound in corroding Particles. But this perhaps requires ſome longer Time.

Having thus given you an Account of the ſeveral Ways uſed to ſeparate the *Cuticula* or *thin Skin*, the next in Courſe is the *Cutis*, or *Skin* it ſelf, being immediately ſubjacent to it. But as the *Anatomiſts* begin their *Diſſections* at the *Abdomen* or *Belly*, it will be requiſite we ſhould previouſly ſay ſomething of this before we proceed to the *Diſſection* of the *Cutis* or *Skin*.

You muſt raiſe the *Navel*, which that you may do with the more Eaſe, preſs it with two of your Fingers, and raiſe it as much as you can, by ſqueezing the Skin on both Sides backwards. You may facilitate this Operation, if you let one of the Standers by preſs the *Guts* on both Sides, ſo as to make the middle Region of the Belly to ſwell. Sometimes the *Navel* lies ſo deep, that one is forced to pull it upwards with a Hook. When you have raiſed the *Navel*, draw a Needle with wax'd Thread thro' it, then tie it with a double Knot, and cut it off with a Pair of Sciſſars at a good Diſtance from the *Navel*. This Operation chiefly takes Place in the Diſſections and Inciſions of the *Cutis* and the *Peritonæum*, as likewiſe of thoſe *Ligaments* that proceed from the *Umbilical* Veſſels; as will be more apparent hereafter. We will now come to the *Cutis* or the *Skin it ſelf*, and more eſpecially to that Part which belongs to the *Inferior Concavity* or the *Belly*, the Diſſection whereof I intend to make the Subject of our preſent Diſcourſe; for after having ſhewn you its Separation, it will without much Difficulty lead us into the Way of dividing it from other Parts of the Body alſo. Your Beginning muſt be at the *Navel*, which you muſt raiſe up by taking hold with your Hand of the Thread, and then with a very keen Knife, either, as *Riolan* would have it, make a deep *Circular Inciſion*, or, as it is practiſed by others, let your Inciſion be made in the Form of an ordinary *Tetragonon*, or Four-Square, in ſuch a Manner that the two oppoſite Angles face exactly the Sides, but the reſt the *Pubes* or Privy Parts, and the *Os Xephoides*. This you muſt perform by making a moderate Inciſion, for fear, if you cut too deep, you ſhould wound the ſubjacent Parts; for it is better to make repeated Inciſions, than to ſpoil all at once. This done, you make a ſtrait Line from each Angle of the *Tetragonon* with your Knife, upwards to the very middle of the *Sternum* or *Breaſt-Bone*, downwards to the *tranſverſe Proceſſes* of the *Vertebræ*, becauſe of the Muſcles of the *Abdomen*. But take Care not to make your Inciſion ſo deep thro' the Skin as to touch the ſubjacent *Fat*. However, the *Skin* being of a fibrous and nervous Subſtance, you may put a good Strength to it, for it is apt to give Way to the Knife, and therefore if you don't cut quite thro' the Skin at once, you muſt reiterate your Inciſion.

This done, you muſt proceed to the Separation of the *Skin*. Let ſome Body or other of the Standers by take hold of the Thread that is drawn thro' the *Navel*, and whilſt you your ſelf, either with your Left Hand, or elſe with a ſmall Hook, take hold of either of the Sides of the *Tetragonal* Inciſion about the Navel, you muſt with the Knife in your Right gently ſeparate the *Skin* from the *Fat*. The Blade of this *Diſſecting Knife* ought not to be pointed, but tolerably broad at the Extremity. For Want of ſuch a one, you may make uſe of the *crooked* or *Myrtle-like* Inciſion Knife before-mentioned.

I would alſo adviſe you to manage your Inſtrument ſo as that the ſharp Edge may incline rather to the *Fat*, unleſs you can keep a very exact Equilibrium; for great Care muſt be taken that it bear not too hard

upon the *Skin*, which being very thin in ſome Places, is apt to be wounded; whereas if any ſuch Thing happens in the *Fat*, it carries neither any conſiderable Inconvenience nor Deformity along with it.

Riolan is of a contrary Opinion in the Firſt Edition of his *Anthrop.* and ſays, we had better ſuffer the Knife to wound the *Skin* than the *Fat*, in which he ſeems to follow *Galen*, whoſe Words are as follow: *You muſt ſeparate the Membrane, by turning the Knife gently toward the Skin; for in caſe you put it too cloſe to the Membrane, you will be apt to wound it: But if, whilſt you ſeparate the Membrane from the Skin, you wound this laſt, this will prove no Inconveniency to your intended Operation.* But this Paſſage of *Riolan* has been corrupted, becauſe in the Second Edition theſe Words bear a quite contrary Senſe. And the Words of *Galen* are of no great Weight againſt us, for his Aſſertion is true in Reference of the Diſſection of Brutes, which were the chief Objects of *Galen*'s Operations, but not in Reſpect of the Anatomies of humane Bodies, whereof there are but few Inſtances in *Galen*, but are the chief Subject of this Treatiſe. In Men, the *Carneous* or fleſhy *Membrane* is not immediately ſubjacent to the *Skin*, having the *Fat* betwixt both, unleſs it be in quite emaciated Perſons: But in Reſpect to the Diſſection of *Brutes*, I am of the ſame Opinion with *Galen.*

I have alſo another very commodious Way of ſeparating the *Skin* from the *Fat*; but is not to be made uſe of, unleſs when you intend to divide the *Skin* from the ſaid *Fat*, after both are cut off of the Body, and can't take Place otherwiſe, becauſe the *Fat* is much diſordered by the many Inciſions. It is performed thus: I take hold of the *Skin* with my Thumb and middle Finger of the Left Hand, and put my fore Finger under the Skin that is to be ſeparated, then with the Knife in my Right Hand I make my Inciſion all along the fore Finger, underneath the *Skin*, and take Care to manage my Knife ſo that the whole Breadth thereof be toward the Skin, with the Back only at ſome ſmall Diſtance from it; by which Means, if any too deep Inciſions happen to be made, it will not affect the Skin, but touch only the *Fat.*

'Twas *Galen*'s Opinion at firſt, That the Operation made upon the Skin was not worth the While and Trouble of ſo expert an Anatomiſt as himſelf; but being taught to his Coſt, that this Operation required an expert Artiſt, he put the Hand to the Worn himſelf, and was forced to confeſs, *That it was a Piece of Work which required a great deal of Exactneſs and Care, and an induſtrious Perſon that muſt be very deſirous of being inſtructed in this Function.* If the Diſſection of *Brutes* requires ſo dextrous an Artiſt, it muſt of Neceſſity follow, that this Operation in humane Bodies is ſubject to many more Difficulties, by Reaſon of the cloſe Intertexture of theſe Parts. But, after all, I don't intend hereby to exclude the young Students, as *Riolan* does, from theſe Operations; but alledge this only by Way of Precaution, that as in all Manner of Diſſections they ought to proceed with the utmoſt Care and Circumſpection, ſo in this eſpecially they muſt manage the *Section* with ſo much Caution as to take effectual Care that nothing may be deformed or ſpoiled by it. You muſt continue the *Separation* of the *Skin* to the very Extremity of your before made Lines, and after having divided it from the *Fat*, lay it open towards the Sides.

The next Thing that falls under our Conſideration is the *Fat*, which, as we told you juſt now, is betwixt the *Skin* and the *Carneous* or fleſhy *Membrane* or *Involidere*, and ſometimes is ſo cloſely interwoven with it, that no Separation is to be made betwixt them, except by the Colliquation of the *Fat*, the *Fibres* of the *Membrane* being interſperſed every where thro' the Subſtance of the *Fat*; ſo that, as *Folius* tells us, it ſeems to make up one *heterogeneous* Body. Therefore this *Membrane* muſt be pull'd off together with the *Fat* from the ſubjacent Muſcles. *Riolan* diſtinguiſhes this Membrane into the *Adipous Fat* and *Carneous* one, but confeſſes nevertheleſs, that they are one and the ſame Thing.

This *Carneous* or *Adipous* Membrane you may ſeparate from the ſubjacent Muſcles, if, after you have with your Diſſecting Knife (as before ſaid) made your quadrangular Mark round the Navel, you make an Inciſion as well in the *Skin* as the *Fat* in the Form of a *Latin* X, and along theſe Inciſions pull aſide

ſide or ſeparate the *Pinguedo*, or Fat, by the Help of your Nails, and by inſerting the Myrtle-like Diſſecting Knife (which muſt not be very keen, becauſe they are coherent only by very thin Membranes) very gently, without the leaſt Force, betwixt the Membrane of the Muſcles and the *Carneous Tunicle*. Whilſt you are intent upon the Inciſion of theſe Fibres, you muſt not forget to take Notice here of the ſmall Veins which you ſee interſperſed here and there thro' the *Fat* and *Skin*, but eſpecially thro' the *ſtrait Muſcles*. But 'tis ſufficient at this Time only to take Notice of them, becauſe they are to be ſeparated hereafter. The *Fat* and *Skin*, after their Separation from the Muſcles, muſt be laid aſunder on both Sides.

This is the true Method of ſeparating the univerſal or common Integuments of our Body, which may take Place in almoſt every Part of the Body, except in ſome few; and therefore that nothing may be wanting on our Side, we will not neglect to inſert theſe various Operations (as Occaſion ſhall require) in the Anatomy of each particular Part.

CHAP. II.

Of the Muſcles of the Abdomen, *or inferior Concavity of the Body.*

Galen makes uſe of Two different Ways in the Separation of the Muſcles of the *Abdomen*; one, by making an Inciſion among theſe Muſcles, after having opened the *Thorax* or Breaſt, and taken a View of the *Viſcera*; and the Second, by beginning his Inciſion here, according to the Method uſed by our Modern Anatomiſts. But this Difference having no Relation to the Operation it ſelf, I am willing to paſs by here; but muſt nevertheleſs put you in Mind, that there are Two Ways ſtill of making the Inciſion of the Muſcles of the *Abdomen*, *viz.* either at their Origins, or elſe at the Commixtion of their *Tendons*; where it is further to be obſerved, concerning the *tranſverſe* and *aſcendent* Muſcles of the *Abdomen*, that in caſe you intend to enter upon their Separation at their Origin or Beginning, you muſt turn the Body upon that Side which is oppoſite to that where you propoſe to make your Operation, that ſo you may place your ſelf, when you are to begin the Inciſion, at the back Side, and reach with your Knife as far as to the Loins.

And firſt of all beginning with the *oblique deſcendent* Muſcles, you muſt thus ſeparate them from the Ribs: Fix the Point of your Knife in that Part where you ſee this Muſcle joined to the Muſcle called *Serratus Anticus major*, and with a gentle Inciſion ſeparate theſe *acuminate dentiform Proceſſes*, till you ſee the Ribs appear; but becauſe they are coherent alſo to the *Intercoſtal* Muſcles, great Care muſt be taken not to hurt theſe. This done, take hold with your Left Hand of theſe *Teeth-like Eminencies*, and go forward with your Knife, but not without the utmoſt Caution, for fear you ſhould cut aſunder the Nerves, which not far from the Beginning, together with the Veins and Arteries coming out of the *intercoſtal* Spaces, inſert themſelves into this Muſcle. Then, as we told you before, turn the Body directly upon the oppoſite Side, that ſo you may be able to ſeparate the *broadeſt Muſcle* of the Back, Part of which, near the *Vertebres*, is ſpread over this Muſcle, ſo as that it may be laid a little on one Side backwards. After this, ſeparate the beforeſaid *Teeth-like* Proceſſes, as likewiſe the Muſcle it ſelf, from the ſubjacent one, κατὰ ἀπόσιν, *i. e.* by Way of *Excoriation*, ſo as always to proceed backwards and downwards till you come to the Buttocks, where you muſt cut it aſunder. After this you muſt ſeparate its tendinous Connexion from the Bone call'd *Iliax*, by bringing your Diſſecting Knife underneath thro' the *Spina* to the *Pubes*; which done you may ſeparate the Reſt by Way of *Excoriation*. There is ſo nice and intricate a Contexture betwixt the *Tendon* of this and that of the *Oblique Aſcendent* Muſcle, as ſcarce to be diſcernable by the Eye.

If you intend to begin at the Inſertion, you muſt cut aſunder the *Tendon* of the Muſcle, with a very keen Knife, at the very Beginning of the *Semilunar Line*, as it is called by *Spigelius*, being that very Part which is adjoining to the Extremity of the carneous or fleſhy Subſtance of this Muſcle; and then ſeparate it from the *Oſ Ileum*, and from the Buttock and the reſt by Way of *Excoriation*.

When

When you come to the Beginning of it, you will be better able to diſcover with your Eyes the ſmaller Nerves, Veins, and Arteries heretofore mentioned. This Operation may be performed with more Eaſe, if you begin your Inciſion at the *Spine* of the Bone *Ileon*, and by putting your Finger underneath divide the *Deſcendent* and *Aſcendents* by Way of *Excoriation*, and cut aſunder with your Knife the Beginning of the *Tendon*.

The Diſſection of the *Oblique Aſcendent* Muſcles muſt be begun at the Loins, where the very Beginning of the *nerveous* Part of the *tranſverſe* Muſcles ſhews you the Place how far you muſt penetrate with your Knife, becauſe it will diſcover it ſelf by its white Colour, to forewarn you that you are not to touch it at this Time; and thus you are now led to the Beginning of the Diſſection of this Muſcle. Then go forward with your Knife towards the *Pubes*, and ſeparate it from the Extremity of the *Os Ileon*, by putting your Finger underneath, and your Knife very deep, after you have parted it by Way of *Excoriation* from the *tranſverſe* Muſcle.

Laſtly, where it is joined to the *Cartilages* of the Ribs, you muſt alſo ſeparate and cut it off; but take Care to ſtop your Hand ſo ſoon as you come to the *Semicircular Line*, by Reaſon of the cloſe Intertexture of the *Tendons* there.

If you are inclined to begin your Inciſion at the *Tendon*, you muſt do it in the *Semicircular Line*, and proceed in your Operation in the ſame Manner as has been preſcribed in the *Oblique Deſcendent* Muſcles. The *Pyramidal Muſcles* being involved in many *Involucres* or Membranes, and a great deal of Fat muſt be freed from them. The *Tendons* alſo of the *ſtrait Muſcles* muſt be removed, becauſe they are in ſome Meaſure covered by them, and conſequently are not well diſcernable unleſs theſe are laid aſide. Then begin your Inciſion on both Sides lengthways, ſo that by Degrees you may, as the Inciſion proceeds forward, ſtretch the Muſcle, by the Help of your Finger, toward the oppoſite Side, and ſeparate it, as far as you can, off the ſubjacent Membranes. Then proceed with the Muſcle on the oppoſite Side in the ſame Manner, till they are both cleared from the ſubjacent Parts; and then you may divide them, by making an Inciſion lengthways in the middle, where they are joined to the Membranes. Laſt of all, you muſt alſo ſeparate and cut off the *Tendon*, extending toward the Navel, ſo that you may turn the Muſcles toward the *Pudenda*.

The *Muſculi Recti*, *ſtrait Muſcles*, have in the middle certain *nerveous Lines* or *Interſections*, by which they are cloſely joined on the outſide of the Tendons of the *Oblique Aſcendent Muſcles*; ſo that this Separation requires a Hand well exerciſed in ſuch like Operations; for elſe you will ſpoil theſe Interſections by making your Inciſions too deep. The Tunicle or Involucre of theſe Muſcles you muſt ſeparate, by making an oblong Inciſion near the Navel with your Knife; which Operation would admit of no great Difficulty, were it not for thoſe *nerveous Lines* or *Interſections*, which ſticking, as we told you before, ſo very cloſe to the *Tendons*, you muſt proceed with Caution, in order to ſeparate them by the Help of a very keen *Myrtle*-like Diſſecting Knife. This Skin or Involucre being once taken off, you may with your Left Hand draw the Muſcle aſide, and with due Circumſpection ſeparate it from the *Cartilage Xiphoides*, for Fear of mingling the *Mammary Veins* in that Place. After this you may alſo remove gradually the lowermoſt Part of this Involucre, but take heed not to hurt the Veins which come thither from the *Peritonæum*, or the ſmall Nerves. There you will behold one of the niceſt Maſterpieces of Nature in diſperſing theſe Veſſels, for here you will meet with Veins ariſing from the lower Part of the *Hypogaſtrium*, which ſpread manifeſtly by many Branches into divers Parts of this Muſcle; which however are not (as the common Opinion is) join'd with the *Mammary* Veins by Way of *Anaſtomos*, which I could never find they did; but they dwindle into very ſmall Twigs or Channels before they come quite within Reach of the others ſo as to touch them.

When theſe Muſcles are to be diſſected, you muſt firſt cut away theſe Veſſels, and ſo clear your Way, and make your Inciſion at the Beginning of the Muſcle, that it may be laid aſide towards the Legs.

This Separation of the *tranſverſe Muſcles* requires both careful Eyes, and cautious

Hands; for this Operation is not likely to ſucceed without a very keen Diſlecting Knife, which may ſoon hurt or wound the *Peritonæum* which lies underneath it, and is very thin and tender. Wherefore it requires both Labour and Time, and Patience; for if you are over-haſty in the Operation, this Membrane is in an Inſtant bored through by the Point of your Knife, if it happen to touch it.

This Separation, if commenced at the Inſertion, is ſubject to more difficulty than if taken at the Origine of the Muſcle. In the laſt you proceed thus: I have told you in the Operation of the *Oblique Aſcendent Muſcle*, that you muſt make your Inciſion at the *nervous* Subſtance which is the Beginning of the *tranſverſe Muſcle*. Theſe nervous Fibres, which tend directly toward the Navel, you muſt by two or three gentle Inciſions cut croſs-ways when you will ſee coming out the ſubjacent *Fat* enclosed in a thin Membrane. This you muſt thruſt back again, and faſtning your Hook into the Beginning of the Muſcle, lift it up, and thus ſeparate it from the *Peritonæum* with the Point of your Knife, yet ſo as rather to tear than cut aſunder theſe Fibres. After you are paſſed the *nervous Subſtance*, you muſt put your Finger underneath near the *Cartilages* of the ſpurious Ribs, in order to ſeparate the Beginning of this *Carneous* Part, and to diſſect the Muſcle with the Knife upon your Finger: And becauſe there is but little Space near the *Enſiformis Cartilago*, one of the Standers by muſt, to help the Anatomiſt in his Operation, keep back theſe Ribs. The Muſcle being thus ſeparated from the *Cartilages*, it muſt be done in the ſame Manner alſo from the Bone *Ileon*. The remaining Part of the Muſcle may be ſeparated from the *Peritonæum* in the ſame Manner as before at the Beginning of the nervous Subſtance; but not without a great deal of Care; for if the Tendon be broad and thin, the *Peritonæum* will ſtick very cloſe to it.

If you go the contrary Way to work, you muſt begin near the *Semilunar Line*, at the Beginning of the Tendon of the Muſcle. This you muſt perform with a gentle Inciſion, to be repeated three or four Times, till you ſee the *Peritonæum* gradually ſeparated from the *Tendon*. The Section ought to be made lengthwiſe on the *Abdomen*; after which you may fix your Hook to the *Tendon*, and lifting it up, ſeparate it, or rather ſcrape it off gently from the *Peritonæum*; to perform which, you muſt tie the Back of your Knife toward the *Peritonæum*, and the Point or Edge of the Blade toward the Muſcle.

CHAP. III.

Of the Peritonæum, *or Rim of the Belly, and the* Omentum, *or the* Caul.

WE muſt now come to the *Peritonæum*. You muſt lift up the Navel by the String, and then perforate the *Peritonæum* on each Side. This done, thruſt your Diſſecting Knife ſo as that the Point be turned upwards into the Hole towards the Loins. Thus you muſt proceed alſo on the other Side; but take Care not to hurt the Inteſtines, which will, in corpulent People, protuberate or come out not without ſome Violence. When you have put theſe again into their Place, you muſt make ſuch another Inciſion in the upper Part of the *Peritonæum*, near the *Cartilago Mucronata*, and thence paſſing with your Knife thro' the Left Side to the lateral Inciſion, there cut aſunder the Fourth Part of the *Peritonæum*, and ſpread it open upon the Breaſt. Then take hold of the Second upper Part of the *Peritonæum*, either with a Hook, or your Hand only, and ſeparate with your Knife the *Umbilical Vein*, Part of which adheres to the Inſide of the *Peritonæum*, and this being done, make your Inciſion here near the Navel, and extend it alſo upon the Breaſt. Thus one half of the *Peritonæum* being laid out of your Way, begin with the other half, which you muſt divide by an oblong Inciſion quite down to the *Pubes*; but take Care to preſerve the *Urachus* entire, the Situation whereof you will find by putting your Hand within, which will be a ſure Guide to ſend you to the Place where the Section is to be made. After this, draw a little aſide the *Peritonæum*, as I told you before concerning the *Umbilical Vein*, and ſeparate the *Uterus* and *Umbilical Arteries*, and after you have cut the *Peritonæum* near the Navel, throw it on both Sides. *Riolanus* uſed to cut aſunder the

the *Peritonæum* with a Pair of Sciſſars. You muſt not forget to take Notice of the Duplicature of the *Peritonæum*, which is moſt conſpicuous in the *Pelvis*, where the Bladder is encloſed in this Duplicature. *Riolan* places the Kidneys alſo within this Duplicature; neither muſt the *Proceſſes* be forgot here, two of which ariſing out of the Sides, cover in Men the ſpermatick Veſſels and Teſticles, and in Women the rotund Ligaments of the Womb.

But before you go on any farther, you muſt remove the Navel, which elſe would hinder your Operation. Therefore cut off the *Urachus* and *Umbilical Arteries* near the Navel, and lay them on both Sides, and place the Navel, with the *Umbilical Vein* adjoining to it, upon the Liver.

After the Removal of the *Peritonæum*, the *Epiploon*, or *Omentum*, comes immediately unto your Sight. It conſiſts of two Membranes, which if you have a Mind to diſcover, make an Inciſion in one of them wherever you think beſt; but eſpecially in that Place where it adheres to the *Colon*: After which you may put in your Hand, or elſe a Style, and move to and fro betwixt the Duplicature. If you have a Mind to ſeparate them, you may begin at the Right Side at its Extremity, and from thence proceeding to the Left Side, cut it off from the *Colon*. When you come to the Stomach, you may pull it out if it be empty, for if it be full, it will come forward of it ſelf; then cut off the *Epiploon*, ſo as not to hurt the *Vena Coronaria* of the *Stomach*, after which you may take it out without any further Trouble.

This done, you will ſee the *Inteſtines* laid open, together with the *Stomach*, whoſe natural Situation after you have taken a View of, you may proceed in your Operation.

CHAP. IV.

Of the Stomach, Inteſtines, and Meſentery.

THE common Way is to take out at once the *Stomach*, *Inteſtines*, and *Meſentery*, which is perform'd thus: Place your ſelf on the Right Side of the Body, and after you have removed the leſſer Inteſtines toward the Left, ſeparate by Way of *Excoriation* the *Colon* where it adheres to the *Peritonæum*. This done, ſeparate alſo the *Lien* or *Spleen*, from the *Peritonæum* by the ſame Method; but take Heed you don't tear its Skin or Tunicle, it being very thin. Thus you will come to the Stomach and its ſuperior Orifice, and the *Oeſophagus*; but beſides, this is faſtened to the *Vertebres*, and lies pretty deep. Put underneath that Place of the Body where the Stomach lies a Log of Wood, or a Stone, that thereby the Region of the Stomach be raiſed above the Breaſt and lower Parts: Then put in your Left Hand betwixt the Stomach and the Left *Hypochondria*, and with your Finger tear aſunder the Membranes betwixt the *Oeſophagus* and the *Peritonæum*, and take hold of the former with two of your Fingers, and bring it forward ſo far as to be able to make a double and ſtrait Ligature with a ſtrong Thread, and then cut aſunder the *Oeſophagus* with your Diſſecting Knife betwixt the two Ligatures. This done, take hold of the Orifice of the Stomach, and ſeparate it from the *Peritonæum*.

After this, place your ſelf on the other Side, I mean to the Left of the Body, and after having replaced the Inteſtines and Stomach in their own Stations, diſſect in the Right Side, under the Liver, the *Colon* from the *Peritonæum*, where it is joined to the *Veſicula Bilearia*, or *Gall-Bladder*, from whence it has got its yellow Tincture. It alſo approaches near to the Kidney, and is joined to its *adipous Membrane*, by very ſubtil Fibrilles, which you muſt ſeparate, but ſo as to take Care not to meddle with the *Atrabileous Capſules*. Thence you proceed to the Inteſtine *Duodenum*, wherein the *Ductus Cholagogus* is inſerted. This you muſt ſecure by a Ligature near to the Liver, and cut it off toward the Inteſtines. You muſt furthermore look after the *Vena Portæ* in the Concavity of the Liver, and cut it aſunder, after having ſeparated the Fat from it, cut it off. In the ſame Manner proceed with the *Meſenteriack* Arteries, and thus the *Meſentery* being cleared, lay it aſide together with the Stomach and *Spleen*. There being nothing left now that ought to be removed but

the *Inteſtinum Rectum*, which reſts upon the *Pelvis*. Therefore put your Hand into the *Pelvis*, and putting your Finger cloſe to the ſaid *Inteſtinum Rectum*, preſs it upwards, ſo that you may be able to make a double Ligature, and ſo cut aſunder the *Inteſtinum* in the Interſtice betwixt theſe two Ligatures. It would be requiſite to pull out not only one Part, but alſo the whole Inteſtine; but that its being ſo cloſely coherent to the circumjacent Parts, makes it very difficult to be diſunited from them. Add to this, that the Narrowneſs of the Place betwixt the Feet where the Anatomiſt ſtands, together with the great Quantity of Fat, proves no ſmall Impediment to this Operation.

The Inteſtines, *Spleen*, *Pancreas* or Sweetbreads, Stomach, and *Meſentery*, being thus taken out, muſt now be divided from one another. Firſt therefore ſeparate the *Spleen*, with its *Splenatick Branches*; and as for the Inteſtines, you muſt diſpoſe them in ſuch a Manner upon a Table, that that Part of the *Sweetbread* where the *Splenatick Vein* and *Artery* are joined to it may lie uppermoſt, ſo as to be able to ſeparate them by the Help of your Diſſecting Knife, by making your Inciſions lengthways in the *Sweatbread*. Each of theſe before-mentioned Branches muſt, after their Separation, be bound up by Ligatures, and then cut aſunder. You muſt alſo find out the Inſertion of the *Vas Breve* into the Stomach, and after having tied it by a Ligature cut it off, and then ſeparate the *Spleen* for its further Preparation. In the next Place, you ſhould proceed to the Separation of the *Sweetbread*; but becauſe the Canal or Duct of *Viſurgius* is not to be diſcovered without you open the *Duodenum*, you muſt in that Reſpect content your ſelf with clearing it from its Membranes, ſo that it may adhere ſingly without them to that Inteſtine.

And becauſe the Inteſtines are uſually laid upon a Table, and expoſed to the View of the Spectators, they muſt be purged of their Excrements, and afterwards blown up. The firſt you may perform by adapting a Funnel to the Orifice of the Stomach, thro' which you may pour in a certain Quantity of Water, till it comes out again at the lower Parts thro' the *Colon*; This you may repeat ſeveral Times; for if you attempt to do it the contrary Way, it will not ſucceed; ſince even the Air that is blown in that Way will not penetrate beyond the *Colon*, and much leſs the Water. The Second is to be done by putting a ſmall Pair of Bellows into the Orifice of the Stomach, and ſo to blow into them, after you have tied up the Extremities with a ſtrong Thread.

You muſt alſo take Notice in the Inteſtines (after they have been taken out) of their Membranes. *Galen* mentions no more than two of them, but does not comprehend within their Number the firſt, which belongs to the *Peritonæum*, as we do now a-days: With this Difference nevertheleſs, that this firſt is called the *Common Membrane*, the others the *Proper Membranes* of the Inteſtines. Theſe three Tunicles or Membranes you may diſcover in the following Manner: Where you before obſerved the thin Membranes to ſlide back in the Separation of the *Meſentery*, there you muſt raiſe them up again with your Nails, and ſeparate them by ſhaving rather than cutting, and this is the firſt Tunicle proceeding from the *Peritonæum*. This Skin being removed, make in that Place an angular Inciſion, lift up the Second Membrane, and ſeparate it from the Third, which remains behind, covered on the Inſide with a mucous Cruſt, which you may diſcover by making an Inciſion, and opening the Inteſtines lengthways.

Two Things more are worth Obſervation in Relation to the Inteſtines, before you come to the Stomach, *viz.* the *Inteſtinum Cæcum*, and the *Valvula*, which parts the leſſer and larger *Inteſtines* or Guts. To have the better View of both, you muſt cut off a Piece of the *Inteſtinum Colon*, and of the *Ileum*, about the Length of a Palm; for the *Colon* adheres to the outſide, and the *Valvula* lies within.

To make the more exact Obſervation of the Uſe and Poſition of this *Valvula*, pour ſome Water into the *Colon*, which you will not ſee come out at the other End unleſs the *Valvula* being very flaccid; but if you put ſome Liquor into the *Ileum*, it will open its Paſſage in an Inſtant. The *Inteſtine* being cleared of the Water, make an Inciſion in it lengthways, which will give you an exact View of the *Valvula*. *Tulpius* has given

ven us a more ample Deſcription, as well of the Method of Diſcovering, as of the Nature of this *Valve*.

After having viewed the *Valvula*, you muſt come to the *Inteſtinum Cæcum*, which grows to the *Colon*, being very ſmall in Compariſon to the other Inteſtines. I once found a very large one in an Infant, being three Times bigger than the *Colon* it ſelf. You may, by putting a Style into its Entrance, try whether it has a double Paſſage, as ſome will have it; and *Riolan* ſays, that it is ſuch in Brutes; or whether it be ſingle, ſuch as I have at all Times obſerved it. In Children it is bigger, in Proportion to their Bellies, than in full grown Perſons, and filled up with Excrements. Sometimes this Inteſtine is quite miſſing, as *Salomon Albertus* has very well obſerved; and the ſo much celebrated *Bartholin* did make the ſame Obſervation, and found it wanting in a Body anatomized in Publick but laſt Winter.

L. 3. Obſ. 21.

After you have done with the Inteſtines, if you have taken out the *Stomach*, you muſt go about the ſeparating of its *Tunicles* or *Membranes*, in the ſame Manner as has been mentioned before in the Inteſtines. Due Regard muſt alſo be had to the *Gaſtrick* Veins, ſpread all over the Bottom of the *Stomach*, and its Orifices muſt be opened by the Help of the Diſſecting Knife, that ſo you may take a full View of its *Carneous Fibres* in the Left or ſuperior Orifice, and of that thick *Circle* which, not unlike the *Sphincter*, encloſes the Inſide of its Inferior or Right Orifice, called the *Pylorus*.

But ſince in this Method of Diſſecting of Bodies many Things are cut away which might be more conveniently preſerved, I agree with *Riolan* in this, that it would be better to begin with the *Inteſtinum Jejunum*, and ſo to take out only the Inteſtines at firſt. In this Operation you muſt proceed thus: After you have ſeparated the *Colon* in the Right Side, thruſt it towards the Left, that ſo you may open your Way to the *Duodenum*, where you muſt take Care to find out the Entrance of the *Bileous Paſſage*; and below it make two Ligatures on the ſaid Inteſtine, betwixt which you muſt cut it aſunder. Then take hold of the Inteſtine, and with a gentle Touch upon the *Meſentery*, ſeparate its exterior Membrane, ſo that the Inteſtine being cleared of it, will ſave you the Place where you muſt make your Inciſion on the Second, *viz.* next to the Inteſtine. In this Operation you muſt continue your Inciſion both in the ſuperior and inferior Membrane, till you come to the *Inteſtinum Rectum*, which, as we told you before, is to be taken out.

Fernelius makes Uſe of the ſame Method in his Diſſections, with this Difference only, that he begins with the *Inteſtinum Rectum*, which he ties up by two Ligatures, and then cuts it aſunder in the Interſtice betwixt them, that ſo all the Inteſtines may be removed with more Conveniency at once.

The ſame *Fernelius* tells us, that ſome uſed to fill the *Stomach* through the Mouth and Throat with Water before they take it out, thereby to extend and diſcover the better its natural Situation, which I leave to every Body's Diſcretion.

After the Inteſtines are taken out, there ſtill remain behind the *Stomach*, the *Spleen*, the *Sweetbread*, and the *Meſentery*, which are taken out together in ſuch a Manner as we have ſhewn before. But if you propoſe to proceed in this Way, I adviſe you to take out the Stomach, together with the *Oeſophagus*, and then the *Liver*, *Spleen*, *Sweetbread*, and *Meſentery*, at once. But I muſt tell you, that this laſt Method is ſeldom put in Practice by the Anatomiſts; nevertheleſs I thought fit to inſert it here, that in caſe you ſhould one Time or other have Occaſion to inveſtigate the Nerves proceeding to the Stomach, you might know the Way how to do it. The Operation is performed thus: Firſt of all the *Thorax*, or Breaſt muſt be opened, after the ſame Manner as ſhall be ſhewn hereafter, and its *Viſcera* be ſeparated as you will ſee anon; with this Caution nevertheleſs, to take Care not to cut out the Nerve of the *Sixth Conjugation*, as it is called, along with the reſt. Then make an Inciſion into the *Diaphragma* to the Hole where the *Oeſophagus* paſſes through it, which you muſt ſeparate from it, ſo as to take Heed once more not to cut aſunder the Nerves of the *Sixth Pair*, which alſo paſs that Way. After this, cut aſunder with your Myrtle-like Knife the Membranes by which it is joined to the *Arteria Aſpera*, or Windpipe, ſo as to

clear

clear it from all the coherent Parts in the Region of the Breaſt. Laſtly, cut aſunder the Nerve (near its Riſe) which deſcends with the Stomach, and thruſt the *Oeſophagus* downward thro'an Opening made in the *Septum Tranſverſum*, or *Diaphragma*, into the *Abdomen*.

Furthermore, the Liver muſt be ſeparated from the *Diaphragma*, as will be ſhewn hereafter, and removed to the Left Side of the *Abdomen*, after having made a Ligature on the Trunk of the *Cava deſcendens*. Next you muſt take Care of the Separation of the *Meſenteriack Arteries*, which, after they have been tied up by Ligatures, muſt be cut off. For the reſt you may proceed in the ſame Manner as you have been told before, concerning the Removal of the Stomach, Spleen, and Sweetbread. All theſe Parts being taken out of the Body, lay them upon a Table, and firſt of all take Care to clear the Veſſels of the *Meſentery* as far as to the *ſplenatick* Veſſels of all the Fat, make your Ligatures under theſe laſt, and then cut off, and lay on one Side the remaining Part of the *Meſentery*. The other Parts you may diſpoſe thus: Lay the Liver upon its Convex Part to the Right, the *Spleen* to the Left, and the *Stomach* in the Middle, and the *Sweetbread* upon it. Things being diſpoſed in this Order, clear the bileous Paſſage of its Fat, that ſo you may diſcover its Progreſs and Entrance into the *Duodenum*. Then likewiſe ſeparate in the ſame Manner the *Splenatick* Branches, both the Vein and Artery, of their Fat and Membranes, and do the ſame with the *Vas Breve* which joins the Stomach to the *Spleen*. Next to this, take the Stomach in Hand, and beginning at the upper Part, ſeparate the Nerve of the *Sixth Pair*, proceeding to the Stomach; and, by ſeparating the Membranes, lay open that *Plexe* of *Nerves* which opens to our View the higheſt Maſterpiece of Nature, in the Diſtribution of the Veſſels. Laſt of all, you muſt proceed alſo to the Separation of the Muſcles of the *Oeſophagus*. Moſt commonly the *Gargareon* or *Uvula* is coherent to the *Oeſophagus* with its Muſcles, which you muſt remove by Amputation, and you need not eaſily fear the wounding of its Muſcles, becauſe they lie on the Sides, and not upwards toward the *Oeſophagus*. There are many *Muſcles* belonging to the *Oeſophagus*; the biggeſt of all is the *Sphincter*, which ſhuts its Orifice, and ſurrounds it like a Circle. It is ſoon diſtinguiſhed from the reſt, by the circular Poſition of its Fibres. The other Muſcles, which lie juſt by one another, and are compoſed very near of the ſame Fibres, are very difficult to be diſtinguiſhed. The ſmalleſt of them is called the *Lopharyngæus*, being next adjacent on both Sides of the *Sphincter*. The Second being ſomething broader, and known by the Name of *Sphænopharingæus* is joined to the former at the Place of its Inſertion, but does not adhere to it in its Beginning. *Cephingalopharous* is the 3d and broadeſt of the Three, and is ſeated on the back Part. There are Two of each of theſe Three Muſcles, one on each Side, which make up three Pair of Muſcles. How they are to be ſeparated, is eaſy to be known from what has been ſaid before. Becauſe the *Meſentery* is coherent to, and binds together the Inteſtines, we muſt treat of that alſo in this Chapter. Here you muſt take Notice of its *Veſſels*, *Membranes*, *Glandules*, and *Fat*. Sometimes you meet here with ſo great a Quantity of *Fat*, that you can ſcarce diſcern its Veſſels; but more eſpecially the *Lacteal* or *Milky Veins*. The *Meſentery* has here and there many Glandules, the biggeſt whereof is ſeated near the larger Branch of the *Vena Portæ*, and gives a eaſe Paſſage to the *Lacteal Veſſels*. *Aſellius* has given it the Name of *Pancreas*, which has created a Miſtake in ſome. They are ſeldom or never ſeparated from one another; but the larger Ones are diſſected only to diſcover the liquid Matter that is contained in them. It has a twofold Membrane, which comes from the *Peritonæum*; and to find out this Duplicature, you need only make an Inciſion in one of theſe Membranes, where you pleaſe, and pull it off toward the Inteſtines, for it will come off with Eaſe, and will give you a full View of the ſubjacent Glandules and Fat; and the other Membrane you will meet with entire on the oppoſite Side. *Galen* gives us the following Method concerning the Duplicature of the Membrane of the *Meſentery*. *Make a moderate Inciſion with a very ſharp Diſſecting Knife into the more convex Part of the Inteſtine, ſo as to cut aſunder the exterior Membrane or Tunicle; but don't touch the interior One. You muſt alſo endeavour to ſe-*

parate by a double Inciſion the Peritonæum, *till you come to the lowermoſt circular Part of it, when you muſt with all poſſible Care purſue your Buſineſs, to diſcover both Sides; ſo that by making two Inciſions in one of them, you will certainly come to the Sight alſo of the Second.* The *Meſentery* contains Veſſels of all Sorts, the moſt conſpicuous among them are the *Venous* and *Arterious* Ones; and in living Creatures, or ſuch as have been fed juſt before they were ſuffocated, alſo the *Lacteal Veins.* They are diſtinguiſhed from one another by their Colour. The *Veins* are of a livid Colour, by Reaſon of the tranſparency of the Blood. The *Arteries* are whitiſh, or rather inclining to a yellowiſh Colour, becauſe they are empty, and the *Lacteal Veins*, if they are full, look perfectly white; but if empty, are not diſcernable: But of theſe in the next following Chapter. Thoſe that are moſt curious in Anatomical Diſſections, will ſometimes ſeparate the Veſſels of the *Meſentery* from the *Fat* and *Glandules*, the better to ſhew the Diſtribution of theſe Veſſels, in the following Manner: They take off the Skin, beginning with the *Vena Portæ.* This may be done with your Nails, without the Help of a Knife, and then you may take off the Membrane alſo on the other Side. The Membranes thus removed, clear the larger Veſſels of the *Fat* with your Knife, till you come to the leſſer Ones, where you meet with a tireſome Piece of Work, by Reaſon of that vaſt Number of *Capillary Veſſels.* To avoid this Tedrouſneſs, expand your *Meſenterium* upon a Table, and with the Back of your Knife ſqueeze the *Fat* out toward the Extremities, by which Means you may clear it of the remaining Fat with much leſs Labour; and as for the Veins, you may if you pleaſe waſh them with warm Water.

CHAP. V.

Of the Lacteal Veins.

COncerning the *Lacteal Veins*, take this Obſervation before-hand: That the Diſcovery of theſe Veſſels is ſcarce ever to be made in one and the ſame Body, where you propoſe an exact Diſſection of the other Parts; becauſe there are many Reaſons to be given, why theſe Veſſels can't remain conſpicuous for any conſiderable Time after the Death of the Perſon or Creature that is to be diſſected; but more eſpecially thoſe *Lacteal Veins* which are interſperſed through the *Meſenterium*, becauſe being expoſed to the Air, they ſoon vaniſh.

From hence it is evident, that there are two different Operations relating to the *Lacteal Veſſels*; *viz.* one which, without having any Regard to the other Parts, is altogether intent upon theſe; the other which applies it ſelf to theſe alſo, but ſo as not to neglect the reſt. The firſt of theſe two is explained in a moſt perſpicuous Method by that great Anatomiſt *Thomas Bartholin*, in his Hiſtory of the Diſſections of the *Lacteal Veſſels* of the *Thorax*, unto which I refer my Reader; but of the Second I will treat in a few Words.

After you have made an End of the Diſſection of the exterior Parts of the *Abdomen*, lay the *Omentum*, or Caul, which covers the more interior Parts, aſide upwards, and then removing the *Leſſer Inteſtines* from their natural Station, take an exact View of the *Meſentery*, whether you can diſcover there any ſmall white Streaks or Channels, which if you do, you may believe them to be the *Lacteal Veins* of *Aſellius.* If none of them appear upon a very narrow Inſpection, you may conclude that the Creature has been too long a faſting before its Death, or that you have ſpent too much Time in the Separation of the exterior Parts. But if they appear, you muſt look after the Glands of the *Meſentery* which is ſeated in its middle, where the *Vena Portæ* divides into many Branches. Here you will meet with a Confluence of many *Lacteal Veins*, which from thence extend themſelves toward the *Lumbares Glandulæ.* 'Tis ſufficient to get a Sight of them here; for you muſt now go on in the Operation of the Inteſtines, the Stomach, Liver, and the other interior Parts of the interior Concavity, as will be ſhewn in its proper Place. After this, you muſt proceed to the Diſſection of the Breaſt in the uſual Manner, (of which in the Second Book) ſo that the *Spine* of the Back may be laid open to your View. But in the Separation of the *Vital Organs*, you muſt have a particular Regard to theſe two Things: Firſt, that the *Left Subclavia* be tied up by a Ligature immediately after its Riſe out of the *Trunk*; Secondly, that when you ſeparate the *Aorta*, the Fat which

which lies underneath, and upon which it reſts like a Pillow, be taken off entire, and remaining cloſe to the *Spina*, for within this lies the *Lacteal Veſſel* concealed.

The *Spina* being thus laid open to your Eyes, you muſt make an Inciſion into the *Diaphragma*, and ſeparate with Care its Proceſſes from the *Vertebres* of the Hips, eſpecially that on the Right Side, under which moſt commonly the *Lacteal* Branch or *Duct* which aſcends to the *Thorax* is hidden; then proceed to the Inveſtigation of the *Lacteal Vein* in the following Manner. If the Glandules are ſtill there, open them gently, and you will without much Difficulty diſcover the Progreſs of the Veſſels. If they be already taken away, don't loſe your Courage upon that Account; but with the Point of your Diſſecting Knife gently and by Degrees remove the Fat from the *Vertebre's* of the *Spine*, and it will of Neceſſity fall out ſo, that this Veſſel will at laſt appear. You may alſo peel off the Fat with your Nails.

After you have found it out, lift it up with your Hand, or a ſmall Hook, and clear it on the upper Part from the Fat, and on the under Part of the *Spine*. But becauſe near the *Claviculæ* which join the *Sternum* to the *Scapula* it is oftentimes divided into ſeveral Branches, it requires all your Induſtry to find them out. Therefore that you may well diſtinguiſh theſe Branches which are very ſmall, you muſt make an Inciſion in the lower Part of this Veſſel or Duct, and in the Opening put a hollow Style or *Tubulus*, and then preſſing the Veſſel cloſe to the Extremity of it, let ſome Body or other blow into it; ſo that, by the Motion cauſed by the Intromiſſion and Force of the Air, you will be able to judge in what Place you muſt make the next Inciſion, and conſequently whether it enters the *Subclavia* by one ſingle, or by two or three Branches. You muſt alſo take off the Fat in that Place where you perceive the Motion to be ſtronger than in the other Parts.

If this Duct or Veſſel goes forward with one Branch only, it has a ſmall *Valve*, which you may diſcover thus: Make a Ligature at the Extremities of the *Jugular* and *Axillar* Veins, to prevent the Inconvenience of the Blood iſſuing from thence; and then make an Inciſion lengthways in the *Axillar* Vein, and either blow, or elſe by Way of Injection ſquirt ſome Water into it, and where you obſerve the Motion to be ſtrongeſt, there is the Inſertion, and a thin ſmall Membrane, which ſerves inſtead of a *Valve*, to prevent the Recourſe of the Humours, as you may be convinced by your Eyes, if you take an exact View of the *Subclavia*.

CHAP. VI.

Of the Pancreas *or* Sweetbread, *and the* Lien *or* Spleen.

THE *Viſurgian Duct*, on Account whereof this Operation of the *Sweetbread* is chiefly undertaken, terminates in the Inteſtines. Wherefore if you have a Mind to ſee its Inſertion, you muſt of Neceſſity cut off a certain Portion of the *Duodenum*, without which you will not be able to trace the Inſertion of this *Duct* or *Paſſage*, which enters this Inteſtine in Conjunction with the *Porus Choledicus*. And 'tis upon this Score, that perhaps it would not be amiſs, as we told you before, to take out the *Liver* at the ſame Time with the *Sweetbread*, that ſo you might have a full View of the Paſſage of the *Gall* to the Inteſtines.

The *viſurgian Duct* in the *Sweetbread* may be diſcovered thus: Make an Inciſion lengthways into the Membrane, or Tunicle of the *Sweetbread*, laid upon a Table, and afterward with the Point of your Diſſecting Knife ſcrape or advance gently deeper and deeper; but take heed not to make any deep Inciſion at once, for fear of touching the *Duct* it ſelf. So ſoon as you ſee ſomething like a *Membranula* appear in the Subſtance of the *Sweetbread*, you may conclude it to be the *Tunicle* of the *Duct*, and therefore trace it further, as well toward the *Inteſtines*, where it becomes wider, as toward the *Spleen*, where it is very ſtrait. It ſends forth certain ſmall Branches on both Ends, to diſcover which, you muſt go on with ſcraping off the glandulous Subſtance of the *Sweetbread* till you come at them. The Entrance of this *Duct* in the Inteſtines is beſt to be found out, either by blowing the Air, or making an Injection of Water into it. To do this, you muſt make Inciſion lengthwiſe in the Duct, and by the Help of a hollow *Tubulus* or Pipe, blow the Air,

Air, or make an Injection of Water, at the Place where it is inſerted in the *Duodenum*; for if you ſhould put your *Tubulus* or Style into the Inteſtine it ſelf, you would loſe your Labour, becauſe its Orifice is covered within there by a thick *Valve*, or Membrane, which prevents the Excrements that paſs thro' the *Duedenum* from entring into this *Duct*. If you blow the Air into the other End, you will be alſo ſenſible of thoſe Valvules which hinder the Air from penetrating to the *Capillary* Veſſels.

To the lower Part of the *Pancreas* or *Sweetbread* adhere the *Splenic* Veſſels, which we told you before ought to be ſeparated when we were upon the Diſſection of the Inteſtines; but if they are ſtill there, you muſt now take them off, in order to the further Examination of the Spleen.

How the *Spleen* is to be taken out of the Body we have ſufficiently ſhewn, and will therefore be needleſs to be repeated here. The *Spleen* being thus taken out, you muſt have a due Regard to its Veſſels, Membranes, and the *Parenchyma*; the main Buſineſs in this Operation is how to ſeparate the Fat which ſurrounds the Veſſels in a conſiderable Quantity; wherefore Care muſt be taken to remove it without doing an Injury to the Veſſels. To do this, it will not be amiſs to inſert gently a Style or Stick into theſe Veſſels, that ſo being rendered bigger and larger, they may be the more obvious to your Eyes. 'Tis to be obſerved alſo, that theſe Veſſels do not always enter the *Spleen* by one ſingle Branch only, but ſometimes two or three. Neither muſt you forget the *Vas breve*, which takes its Courſe to the Stomach oftentimes by one Branch only, but not always, becauſe I lately obſerved in the Body of a *ſplenatick* Perſon no leſs than a Threefold one very viſible to the Eye.

When you are to ſhew the Membrane, make a very ſlight angular Inciſion, and then lifting up the thin Membrane with a ſmall Hook, take it off with the Point of your Diſſecting Knife as far as you think it convenient.

Sometimes you may pull it off as ſoon as you touch it, as it happened lately to me in the before-mentioned Body of the *ſplenatick* Perſon, where the Membrane or the Tunicle of the *Spleen* being very thick and looſed by an Inciſion, was eaſily ſeparated by Way of Excoriation. The Membrane being removed, what remains is called the *Parenchyma*, being joined to the Veſſels. Their Separation ſhall be treated off at the Concluſion of the next following Chapter, after we have done with the Operation of the *Liver*.

CHAP. VII.

Of the Liver.

THE Separation of the *Liver* is ſubject to the greateſt Difficulty of all, by Reaſon of its ſtrait and firm Connexion with the *Septum tranſverſum*, by Means of the *Cava*, which eaſily admitting of a Ligature, muſt be managed by an expert Hand. *Fernelius* is of Opinion, that by Reaſon of its firm Conjunction with the ſuperior Parts, it can't as yet be either diſſected or taken out. But to eaſe your ſelf as much as can be, lay ſomething under the Back, near the *Liver*, whereby this will be raiſed higher, and come lower towards the lower Parts, and the *Viſcera* of the middle Concavity forced toward the Throat. Then have at Hand a lighted Wax Taper, or Candle, to further your Operation, becauſe your Hand being in your own Light, will elſe obſtruct it; and thus provided, enter upon the Diſſection. Firſt, preſs down the *Liver* with the Palm of your Hand, and cut off the *Ligamentum Suſpenſorium* to which it is faſten'd with your Knife. Then take a long Diſſecting Knife at the Extremity of its Handle, that it may enter the deeper, becauſe it muſt penetrate to the *Cava*, which is ſeated very deep. Go on with your Inciſion of the Membranes and Fibres, till you ſee the livid coloured Blood appear thro' the tranſparent Coat of the *Cava*, which as ſoon as you perceive, ſtop here; and then beginning afreſh on the Right Side, thruſt the *Liver* as much as poſſibly you can to the Left Side. If you think fit, you may lay the Carcaſs upon the Left Side, and cut aſunder the Fibres in the ſame Manner as you did juſt now, or elſe ſeparate them by Way of *Excoriation*, till you ſee the *Cava* appear again there. Then thruſt your Finger underneath the *Cava*, ſo as to open your Way to the other Side without hurting the Trunk

of the *Cava*, whereon you make a Ligature with a ſtrong Linen Thread. The *Deſcendant Trunk* muſt be ſeparated with great Care from the Membranes, and then be ty'd with a Ligature above the *Emulgents*; which done, you may cut aſunder the *Vena Cava* at both Ends next to the *Liver*, which being now quite cleared, you may take out without any further Difficulty.

After you have taken out the *Liver*, you muſt ſhew its Membrane. Make a ſlight Inciſion, if it be angular it is the more proper, after which you may ſeparate it with the Knife, as has been ſhewn before in the *Spleen*. Due Regard muſt alſo be had in the *Liver* of the *Gall Bladder*, and *Bileous Duct*. I told you before, that Part of the *Duodenum* muſt be left behind to trace the Inſertion thereof: Therefore, after having cleared the *Ductus Cholagogus* of the Fat, ſeparate the Bladder, that ſo you may diſcover the Paſſages that lead out of the *Liver* thither. Spread then your Liver upon a Table, in ſuch a Manner that its Concavity be uppermoſt, which muſt be held by one of the Attendants, to keep it ſteady. Then with your middle and fore-Fingers, at ſome Diſtance from one another, thruſt into the Bottom, pull off the Membrane of the *Liver*, and with the Point of your Knife, divide aſunder the Fibres which are extended by the Preſſure, till you get Sight of thoſe leſſer Veſſels which take their Courſe into the ſeveral Parts of the *Liver*, which you muſt preſerve with Care. Near the Extremity of the *Bottom*, you commonly meet with a larger Veſſel. Have you a Mind to ſhew the Place where it is inſerted into the *Duodenum?* You muſt open this Inteſtine, and after having cleanſed it of all its Impurities, ſqueeze the *Gall Bladder*, and ſo take Notice where the *Gall* iſſues forth; or elſe open the *Duct*, and with a Style or *Tubulus* trace its Paſſage, which you will find to end near the Orifice of the *Virſungian Duct*, nay ſometimes it enters thro' the ſame Paſſage. You muſt alſo inſpect the Veſſels belonging to the *Liver*, by tracing their Entrances into the *Liver*, by the Help of a *Style* or *Stick*.

It now remains for me to ſay ſomething alſo concerning the Separation of theſe Veſſels from the *Parenchyma*, before I proceed to any other Matter. This Operation is performed by different Ways; ſome do it in a raw, others in a boiled Liver. Firſt, you muſt take off its Coat, and then, if the *Liver* be raw, you muſt ſeparate or ſcrape off the *Parenchyma* with a wooden Knife. If you go about this Operation ſome Days after the Death of the Party, when the Liver begins to be ſomewhat rotten, it will ſucceed the better: But becauſe it can't be all taken off at once, you may put it in the ſtrongeſt Vinegar for two or three Hours, and then repeat your Operation with the wooden Knife. Thus you may proceed ſo often, till the whole *Parenchyma* be taken off. I have found this Operation to ſucceed much better in the *Livers* of wild Beaſts.

Thoſe that make uſe of a boiled Liver, proceed in the following Manner: They boil the Liver for ſome Time in Water, and then take it off, and beat it with a Stick till the *Parenchyma* (being hardened) drops off, ſo that they may ſee the Veſſels without any Obſtacle. If the *Parenchyma* is not all fallen off, you may macerate your *Liver*, as before, in Vinegar, and then beat it again. Some bury the boiled *Liver* in a Neſt of Piſmires, who will eat all the *Parenchyma*, but leave the Veſſels untouch'd behind. If, after this Separation, you put theſe Veſſels into very clear Water, you will have a moſt exact and pleaſant Sight of all their Branches and capillary Extremities; for they ſwim and diſperſe themſelves upon the Surface of the Water.

What has been ſaid concerning the *Liver*, takes Place alſo in the *Spleen*; the *Parenchyma* whereof you may diſſolve in the ſame Manner, and therefore it would be needleſs to repeat it here.

CHAP. VIII.

Of the Muſcles of the Anus, *the* Penis, *and the* Bladder.

BEgin with the Skin, and make a ſtrait Inciſion all along the virile Member, which you muſt clear of the Skin. The firſt Thing that comes into your Sight, is the *Vena pudenda*, ſtretching toward the *Member*, and ſending forth its Branches towards the exterior Coat of the Teſticles. The Member being cleared of the Skin, that Skin muſt be

be cut off near the *Glans*. After this you muſt alſo take off the Skin of the *Scrotum*, which being adherent here and there to a carneous Membrane, you muſt take that off at the ſame Time alſo. Then pull out the *Teſticles*, and cut off the Fibres which ſtick cloſe to it; but take Heed you don't touch with your Knife the Muſcles called *Cremaſteres*, they being very ſmall, and extended throughout the *Vaginal Tunicles* of the *Teſticles*, which, after they are removed from the *Scrotum*, muſt be laid in the Concavity of the *Abdomen*, in order to their further Preparation. This done, open the Legs of the Carcaſs at ſome Diſtance, and on either of the Inſides of the Hip, make an Inciſion in the Skin up to the very *Podex*, about which you muſt make a circular deep Inciſion, and ſeparate the Skin, as is uſual; ſo that you may ſee the Fat to the Bigneſs of the Palm of your Hand on both the Hips. To eaſe your ſelf in this Operation, raiſe the under Part of the Body by laying ſomething underneath it, that ſo you need not ſtoop ſo low to come at it. Now you muſt put the *Penis* upwards out of your Way, and begin to ſeparate the Fat, wherein you muſt proceed with much Circumſpection, for Fear of hurting the Muſcles interſperſed there. You muſt make your Beginning with the anterior Parts: Separate the Membranes and Fat, and from thence proceed to the Poſteriors. The firſt that fall in your Way, are the *nervous Bodies* of the *Penis*, which have their Riſe from the Bones of the *Pubes*, and under theſe lie its Muſcles; then the *Sphincter* of the *Anus*, which ſurrounds the *Inteſtinum Rectum* in a circular Figure, having its Riſe from the Extremity of the *Os Sacrum*. If you underſtand theſe Things, you your ſelf will be able to comprehend how to make your Diſſection; *viz.* You muſt begin with oblong Sections, and then come to the orbicular Ones. The *Fat* muſt be taken off circlewiſe round the *Podex*, after you have ſeparated the *Fat* ſo as that the Muſcle appears, put your Finger into the *Anus*, and pull it out, that ſo you may take a View of the *Levatores* on both Sides. But if you can't bring them out to your Sight, let them alone till you have an Opportunity of diſſecting all theſe Parts, according to *Galen*'s Opinion, who ſays, That theſe Muſcles which are within the Seat can't be ſeen outwardly, till the Inteſtines are taken out, and the Bones of the *Pubes* ſeparated. Then you muſt proceed to the Separation of the Muſcles of the *Penis*; firſt the uppermoſt, ariſing from the Bones of the *Pubes* called the *Acceleratores* by *Riolan*. Theſe muſt be got off firſt of all. Then make an Inciſion at the Beginning of the other Pair, (which is in the *Sphincter* of the *Anus*) and ſeparate them in ſome Meaſure from the *Urethra*. This will bring you to the Muſcle of the Bladder, which ſhuts and incloſes the *Urethra* in Form of an Orb, and wants not any further Preparation.

CHAP IX.

How to proceed with the Spermatick *and* Urinary *Veſſels.*

IT is now Time to begin with the *Spermatick* Veſſels, which in the preceding Chapter we told you, muſt be laid by, within the Concavity of the *Abdomen*, together with the *Teſticles*. Theſe you muſt clear of their Membranes toward their Beginning, and ſo follow the Tract, whether it be toward the *Trunk* or the *Emulgents*, for Nature is not always the ſame here. The *Ureters* lie under the *Spermatick* Veſſels, being annex'd to them by the *Peritonæum*. The *Ureters* you muſt thruſt backwards to the Back, then take out the Kidneys. Whilſt you remove that on the Right, place your ſelf on the Left Side, and whilſt you take out the Left, ſtand on the Right Side. You will have no Occaſion for a Knife here, for they will ſoon come out, being faſtened only to the *Loins* by ſome very ſmall Fibres. Whilſt you are intent upon ſeparating the *Kidneys*, don't forget the *Renes Succenturiati*, which being ſeated above the Kidneys, towards the Back, and join'd with them, may be very eaſily removed together with them at once, to keep them for a further Preparation. Furthermore, you muſt alſo ſeparate Part of the *Vena Cava* from the ſubjacent *Aorta*. Tie it with a double Ligature, and cut it aſunder, and remove them both; but take Heed, leſt whilſt you are too intent upon the Separation of the Fat, you take away along

with it the *Lacteal Duct* or Branch which lies underneath it. This done, you make two Ligatures in each of the *Iliac* Branches which deſcend into the Legs, and cut them aſunder in the Interſtices. Then you muſt ſeparate both the Trunks, as well of the *Cava* as of the *Aorta*, from the *Vertebres* near the Hips. To begin, as before, from the upper Part, and for Fear the Kidneys hanging thus on the Veſſels ſhould tear them to Pieces, you muſt ſupport them in your Hands. By this Time you will ſee the *Venæ Lumbares* and Arteries make their Appearance, which you muſt cut aſunder, and if you have ſo much Time to ſpare as to make Ligatures in them before-hand, it is the better.

Now you are come to the *Pelvis*, the Parts whereof you muſt manage thus: Cut off the Ligament which faſtens the *Pelvis* to the Juncture of the Bones of the *Pubes*; and next to this do the ſame with the *Nerueous Bodies* of the *Penis*, and the Muſcles called the *Acceleratores*, near the ſame Bones. Turn the Member or Yard back towards the *Anus*, and ſeparate with the Myrtle-like Knife every Thing that ſtill remains adhering to the Bones of the *Pubes*. You muſt alſo divide the Bones of the *Pubes*, which may eaſily be done, either with the *Sword-like* or any other Diſſecting Knife, provided it be pretty thick at the Back, which you muſt thruſt through the Cartilage; but you muſt never attempt this before the *Pelvis* is ſo far cleared, that there is Room enough made for your Finger to enter in it. *Fernelius* performs this Operation not without a great deal of Trouble; for he makes Uſe of a bluntiſh Raſor and Leaden Hammer, to open the Bone of the *Pecten*, and with violent Blows drives the Raſor through the *Cartilage* into the Juncture of the *Bones of the Pubes*. You may by Degrees widen the Opening made before, without contorting the Bones, ſo as to diſjoin them from the *Os Sacrum*, (according to *Galen*'s and *Farnelius*'s Opinion) that nothing may be ſpoiled or broken. Through this Opening you may draw out the *Spermatick* Veſſels and the *Ureters*, as alſo the Kidneys, and ſeparate the *Peritonæum* from the Edges of the *Pelvis*: All the reſt may be done by Way of Excoriation. The Bladder and the *Podex* may be brought out thro' the ſame Opening you have made before, and now made wider, and the Remnants of the *Fat* cut off on the Sides, which ends the whole Operation. However, you muſt all this while often make Uſe of a Spunge, to dry up the Blood that will iſſue from the Veſſels, which elſe would prove troubleſome during the Operation.

After all theſe before-mentioned Things have been taken out of the Way, you muſt alſo cut off the *Inteſtinum Rectum*, which has a Relation to your further Preparation. If you have not had an Opportunity before to inſpect the Muſcles called the *Levatores*, you may now clear them of the Fat, and take a View of them; but no certain Rule is to be given concerning this Operation.

CHAP. X.

Of the Preparation of the Kidneys, Renes Succenturiati, *or* Glandulæ Renales, *and of the* Bladder.

Fernelius treating of the Diſſection of the Kidneys, ſays, that they are beſt to be done whilſt as yet remaining in and coherent to the Body; for he makes a Ligature on the *Emulgent* Veins and Arteries, cuts them aſunder, and then takes out the Kidneys, and diſſects them. But I judge it to be much better firſt to take out the Kidneys, together with the ſpermatick Veſſels; and how this Operation is to be performed, ſhall be the ſubject of the following Lines.

After you have cut away Part of the *Inteſtinum Rectum*, lay open all the other Parts upon a Table, ſo as that each of them remain in its natural Poſition. Then begin with the *Kidneys*. The firſt Thing you have to do, is to make an Inciſion in the *Adipous* Coat, in which are likewiſe comprehended the *Renes Succenturiati*, or the *Atrabilaary Capſules*. You muſt be careful not to cut theſe away together with the Membranes, becauſe they look much like *Fat*; therefore ſeparate theſe at the very beginning, together with their Arteries and Veins, ariſing either from the *Emulgents* or from the *Trunks*, and trace their Concavities, by conveying a Style or Stick into them. Then making an Inciſion lengthwiſe along the Kidneys, ſeparate the

Adi-

Adipous Coat, and take it off by way of *Excoriation*. Near the *Emulgents* the Veſſels muſt be looſed and cleared from the *Fat*, in order to diſcover their Diſtribution and Progreſs. The ſecond, or the proper Coat of the *Kidneys*, muſt be ſeparated from the *Parenchyma*, juſt like the Membrane of the *Spleen*, but is ſomewhat more difficult, by reaſon it ſticks cloſer to it. In the *Emulgent* Vein you muſt take Notice of the *Valve*; open it and convey a Style into it; ſometimes you meet with two, and ſometimes alſo with none at all. Then take the Kidney in your Left Hand, ſo as to turn the Inſertions of the Veſſels towards the Palm of your Hand, and the oppoſite Side being uppermoſt, cut aſunder in the Middle with your Myrtle-like Knife; the Inciſion muſt be ſo deep as to reach to the *Ureters*. You will then ſee within the *papillar Caruncles* and *Tubules*, by which the *Serum* diſtils into the *Ureter*, whoſe Beginning is the *Pelvis*. You will alſo here obſerve the *Ureters* taking their Courſe from hence to the Bladder, encloſed by the Membrane of the *Peritonæum*, which you muſt ſeparate thus: Take hold of the Head of the *Urethra*, and let one of the Attendants hold the Bladder, ſo as that the *Ureter* be extended to the utmoſt; then thruſt your diſſecting Knife betwixt the *Ureter* and the Membrane toward the Bladder, that ſo the *Tunic* may be ſeparated, which afterward you may pull off the *Ureter* with your Hand.

In the Preparation of the Bladder, you muſt begin with the Separation of the firſt Coat of the *Peritonæum* by the Help of your Knife, beginning at the Bottom, where you muſt be cautious not to cut the *Urachus*. Near the *Neck* you ſee the *Ureters*, but to diſcover their Entrance, you muſt open both the Bladder and the *Ureters*. Into the *Ureter* you may convey a hollow Style or *Tubulus*, and if you blow the Air into it, you will find the Orifice opening within the Bladder, and the Air or Water paſſing forward betwixt two ſmall Channels, which, when they cling together, prevent the *Serum* from flowing backwards. Neither muſt you neglect the Muſcle of the Bladder called the *Sphincter*, whoſe Station is before the *Proſtates*, and eaſily diſcernable by its circular Fibres after it is cleared of its Membranes; and therefore ſhall add no more of it here.

CHAP. XI.

Of the Virile Parts dedicated to Generation.

YOU muſt begin with the Coats of the *Teſticles*, and therefore make your firſt Inciſion in that Coat which ariſes from the *Peritonæum*, and being joined to the *Cremaſter*, incloſes the *Teſticle*: It is called the *Vaginalis*. After you have made your Inciſion lengthwiſe ſeparate it with the Knife, firſt of the *Veſſels*, and then of the *Teſticles*. *Riolan* bids us to tear off this Skin or Coat only with the Fingers. The Coat being removed, you will ſoon get Sight of the *Vaſa præparantia*, or preparing Veſſels. Theſe being incloſed in a peculiar Coat, the ſame muſt be taken off, that ſo you may have a full View of the mutual *Anaſtomoſes* of the Veſſels. Therefore after you have laid this Coat together with its Veſſels expanded upon a Table, make an Inciſion with your Knife, yet ſo as not to touch the ſmall Branches of the Veſſels; then either with the ſharp Point of your Knife, or with the Nails of your Fingers, ſcrape and take it off as much as you can; which done, you may alſo ſeparate the Veins and Arteries join'd together by the ſmall Fibres. It would be an endleſs Piece of Work to pretend to divide them all; therefore it is ſufficient to do it with ſome, or the moſt Part of them. However, near the *Teſticles* theſe *Anaſtomoſes* are not ſo frequently to be met with; but many of theſe Veſſels are interwoven with one another, like the Twiſt of Vines, till they enter the *Paraſtates*; whence they have gotten the Name of *Corpus Pampiniforme*.

Theſe Veſſels, when they are full of Blood, are much more conſpicuous than when empty. You need not ſpend much Time in the Preparation of the *Paraſtates*, they being only to be ſhewn, without being ſeparated from the *Teſticles*, for they cannot be wholly ſeparated. But before you leave the *Teſticles*, you muſt alſo view their third Coat, which it is impoſſible to divide from the

the Subſtance of the *Teſticles* it ſelf. This Subſtance you will beſt diſcover by making an Inciſion into one of them.

The Veſſels called *Vaſa ejaculantia*, convey the Seed from the *Teſticles* to the *Seminal Bladders*. They are in their Beginning full of Windings and Twiſtings, whence they have got the Name alſo of the *Corpus varicoſum*. After they are cleared of their exterior Coat, they may be extended much longer. In their Progreſs you ſee many Veins adhering and twiſting to the Outſide of them, juſt like the Veins in the circular Windings of the Brain, which muſt be taken off together with the Membrane, for elſe they would hinder your View of the Veſſel called the *Vas deferens*: Clear therefore theſe Veſſels as much as poſſibly you can from their Membranes to their very Extremities. Here, after having removed all Impediments, you may diſcover with your Fingers the Situation of the *Proſtates* adjoining to the Backſide of the Neck of the Bladder, and in the Midſt, betwixt theſe two Glandules, you muſt make an Inciſion into the Membranes, where you will meet with a whitiſh Body interſperſed with red Veins; and theſe are the *Proſtates*, which you muſt clear of their Membranes, eſpecially on the Sides, where you will ſee the adjacent *ſeminal Bladders* and *ſpermatick Veſſels*. When you are clearing the Bladders of the Membranes, you may take Notice of certain ſmall Veins lying upon them, by which they are divided in many ſmall Cells. They are joined to the *Vaſa deferentia*, or deferent Veſſels, from whence they receive the Seed, and convey it again into the *Urethra*. That you may be convinced by your Eyes of the Manner of it, open the *Vas deferens*, and through a *Tubulus* blow the Air into it; firſt of all you will ſee the *Bladders* to begin to ſwell, and ſoon after to diſcharge themſelves into the *Urethra*; and that your Eyes may behold the very Place, open the *Urethra* alſo, and you will find the ſmall Extremity to ſwell, and feel the Air to come out there through a very ſmall Hole, for it is a very ſmall Opening in the *Urethra* that affords Paſſage to the Seed.

It remains now we ſhould take into Conſideration alſo the *Penis* or *Virile* Member, belonging properly to Males, and made for the Sake of Procreation. Concerning its Muſcles we have ſpoke before in the 8th Chapter, where we have alſo ſhewn how to ſeparate the Skin and its carneous Membrane, as well as the Prepuce. If you make an Inciſion croſs ways, you will find the Subſtance of the *Penis* ſpongious, and inclining to black. Its nervous Coat wherewith it is covered you may ſee with your Eyes, without giving your ſelf the Trouble of a Diſſection. Its Parts are connected by a ſtrong Ligament, not to be ſeparated without ſome Difficulty. *Spigelius* makes it to be tranſparent, which is more than ever I could ſee as yet. The *Urethra*, or *Urinal Paſſage*, is very near of the ſame ſpongious Subſtance as the other Parts that compoſe it; but is eaſily ſeparated, provided you make your Section lengthwiſe; but its Separation is of no great Moment. You muſt however obſerve, that its interior Superficies is very ſmooth, to inveſtigate which with your Eyes, you need but open it with your diſſecting Knife.

CHAP. XII.

Of the Genital Parts in Women.

THere are certain Parts belonging to the *Pudenda*, or Privy Parts of the Women, which you may view without making Uſe of the Knife. Here you may take Notice of the *Monticulus Veneris*, with the Hairs growing through it; next of the *Labia*, or *Lips*, on both Sides of the *Rima magna*, or Entrance into the *Pudenda*. If you take theſe Lips a little aſide, you will ſee the *Myrtle-form Caruncles*, above them the Extremity of the *Clitoris*, then the Orifice of the Bladder, and laſtly, if it be an uncorrupted Virgin, the *Hymen*. All theſe Things you may diſcover without the Help of your diſſecting Knife; but if you will go further, you muſt make Uſe of it thus: After you have laid open the Legs, and laid a Log of Wood under the Buttocks, make a long Inciſion on both Sides near the *Fiſſa magna*, ſo that they may meet behind the Hole of the *Anus*, and then ſeparate it, as has been ſaid already. But before you ſeparate the Fat, you muſt trace the round

Ligaments

Ligaments of the Womb, *viz.* to ſee (as *Riolan* will have it) whether they extend to the whole Leg, or whether (as it is generally obſerved) they end in the *Os Pubis*. From theſe innermoſt Parts, you muſt, after having made an Inciſion in the *Peritoneum*, return to the exterior Parts: Therefore make your Inciſion in the thickeſt Part of the Fat on the *Mons Veneris*, and ſeparate it near the *Pudenda* from the Hip-bone. If the *Clitoris* be very large, and conſpicuous, you may take a View of its Parts, which are joined near the *Rima* to the *Os Pubis*; and at the Sides you may perceive ſome carneous Fibres, which paſs commonly for the Muſcles of the *Clitoris*. If it be but ſmall, as it happens alſo in thoſe that have lately been delivered of a Child, theſe Things are not ſo much as to be ſeen: However, ſeparate them all from the Hip-bones, ſo as to make ſmall Opening to the Inſide; then diſſect the Bones with your Knife, as we have told you before concerning the Men, as alſo the Fat round the Privy-Parts and the *Podex*.

Now you muſt proceed to the internal Parts; and after having taken a View of the *Matrix* in its natural Poſition, ſeparate firſt of all the Teſticles and the *Vaſa Preparantia*, as well the Artery as the Vein, as likewiſe the Ureters; then make your Ligatures on the Trunk of the Artery and Vein, and cut them aſunder above the Emulgents, and lift them up, and ſeparate them from the *Spine*. If you intend to inveſtigate the Lacteal Duct, you muſt take Care not to hurt it now, it lying very near, as we have told you before concerning the Kidneys. Furthermore, after you have removed the Kidneys and Atrebileous Capſules out of their Places, take them aſide, together with the other Veſſels: But when you come to the *Pelvis*, take Heed you do not cut off any of the Veſſels, unleſs it be that which enters the Holes of the *Os Latum*, or proceeds to the Hip; for it may eaſily happen, that you cut away the uterine Veins and Arteries. After you have taken out thro' the Opening in the *Os Pubis* the Veſſels, and what adheres to them, you may ſeparate what remains in the *Pelvis* by Way of Excoriation, and caſt it away with the Fat you have cut off. All this being done, ſeparate the *Inteſtinum Rectum* from the Neck of the Womb, but becauſe it ſticks very cloſe to it, take Care you do not wound it, for the Knife is very apt to enter through it: Then remove the remaining Fat near the Orifice of the Womb, but ſo as not to meddle with the *Clitoris*. What is further to be done, and how the uterine Veſſels are to be ſeparated, I know not how to expreſs in Words, and therefore am neither able nor willing to confine you to any certain Rules, but admoniſh you to have Recourſe to the Practice thereof, which will be your beſt Guide. However, I will add ſome ſhort Obſervations: Firſt of all, take Notice, That every Thing is to be taken away that does not fall under the Denomination of the Veſſels of the Womb and Bladder. Secondly, always make your Beginning from the larger Branches of the Veſſels, after having clear'd them very well of their Membranes. Thirdly, remove the Fat that lies betwixt the Veſſels, that ſo you may the better diſcover by your Eyes their moſt ſurprizing and innumerable Branches and Divarications. Let this ſuffice in general concerning the Diſſection of the Womb; for to enter upon Particulars, is beyond the Power of Words to expreſs; therefore put your Hand to the Work, and the Practice will ſhew you the beſt Way how to proceed. There are nevertheleſs ſome other Matters remaining, which, before you throw away the Womb, and proceed further, muſt alſo be taken into Conſideration. That you may take a full View of the wrinkled interior Suſtance of the Womb, you muſt open its Neck; therefore with your Diſſecting-Knife diſſect in the Middle the back Part of the Womb, where it is adjacent to the *Inteſtinum Rectum*; thruſt your Knife in as far as the inner Bone of the *Matrix*, the Subſtance of the Neck being very ſolid, and apt to give Way to the Preſſure of your Hand. After having opened the Neck, you will alſo get a Sight of the inward Orifice of the *Matrix*, which is always open, and reſembles the Mouth of a Fiſh.

Then you muſt diſſect the Bottom of the Womb, in order to diſcover its inner Concavity. Some make this Inciſion croſsways, others lengthways, but the firſt ſeems to me to be the moſt proper, *viz.* Begin your Section at the uppermoſt Part of the Bottom,

ſo as to make a ſtreight Line at once with the *Cornua Matricis*, (as they are call'd) and continue your Section thus to its Orifice, ſo that the Womb be cut aſunder in Two equal Parts, or near it. Beſides the fungous Subſtance of the Womb, you will behold here almoſt numberleſs Holes, being the Extremities of the diſſected Veins of the Womb; and if you blow the Air into them by Means of a hollow Pipe, you will find them to reach as far as to thoſe Veſſels that are adjoining to the Teſticle. In the Middle of the Concavity of the Womb, you may take Notice of a Line, owing its Riſe to the *Vulva*.

After the Diſſection of the *Matrix*, you muſt open the *Cornua Matricis* lengthways with your Knife, where near the Bottom you will meet with a very ſmall Nerve, ſo much extoll'd by *Riolan*. It is about Three Fingers Length, and ends in that great Veſſel call'd the *Tuba Fallopiana*, divided into many Cells, as it ſeems, being the Receptacles of a certain viſcous Humour, very near reſembling that which is contained in the Teſticles. You muſt alſo diſſect the Teſticles, to ſee whether the Humour contained therein may deſerve the Name of *Seed* or not.

LIB. II.

Of the Thorax, *or* Breaſt.

CHAP. I.

Of its common Integuments, and of the Teats.

THE common Integuments of the *Middle Concavity* challenge the Firſt Place. The Firſt among them is the *Skin*, the Inciſion whereof is to be carried up to the Throat; then divide it again by another Section, *viz.* to begin at the End of the former Inciſion, and proceeding in a direct Line above the *Acromium*, through the fore Part of the Arm, up to half the Shoulder, and this to be done on both Sides: After which you muſt ſeparate the Skin from the Fat, in ſuch a Manner as has been directed before, *L.* 1. *c.* 1.

Beſides which, you meet here with the Teats, or Breaſts, which lying under the Skin, introduce ſome Alteration in this Separation. In Men, ſcarce any Thing is to be ſeen here but the Nipples, but in the Female Sex many more Things fall under our Operation, eſpecially if they be either Child-bearing or Suckling Women: Therefore whilſt you are intent upon the Separation of the Skin of the Breaſts, you muſt have a Regard to the Glandules which lie interſpers'd betwixt the Fat. When you come to the Nipple, you find the great One to be a Compoſition of many leſſer Ones, unto which there is a Concourſe of ſeveral lacteal Tubules. To preſerve theſe in the Separation of the Skin, you muſt make an Inciſion round the Nipple, and leave the Skin on the Teat; but for the reſt, you may ſeparate not only the Skin on the Breaſt, but alſo in that Part of the Shoulder that is next to it, that ſo you may come to the Sight of the Inſertion of the Pectoral Muſcles. The Skin being removed, you muſt proceed to the Diſſection of the Fat, in ſuch a Manner as has been told you before in the Separation of the Skin, and clear it from the Fleſh. Under the Arm-pits the Separation of the Fat is ſubject to ſome Difficulties, becauſe the Fat lies there intermix'd with the muſculous Parts, therefore you muſt proceed with Caution, for fear of cutting the Veins which from thence deſcend into the Arms.

This is the Method of diſſecting the Carcaſs of a Virgin; but if it be a Woman that has had Milk in her Breaſts, you muſt alter your Operation. The Fat being deeply intermix'd with the Glandules, and ſometimes growing over them, you muſt pull out with a ſmall Hook, and cut off the ſtrong Fibres with the Point of your Knife. By this Means you may take off the Fat without impairing the Glandules, for it lies moſt upon them. Theſe Glandules are joined immediately to the pectoral Muſcles by a peculiar Membrane, which in Women that give Suck is pretty thick, and hard to be ſeparated from the *Glandules*, but very eaſie from the *Pectoral Muſcle*, through which the Veins take their Courſe to the Teats. If there be ſtill remaining ſome Quantity of Milk in the Breaſts, you may diſcover the Lactiferous Veins, or Lacteal Tubules, interſpers'd betwixt the Glandules, and meeting at the Nipple, where they end

in

in thickiſh Branches. To diſcover the Divarications of theſe Branches, you may, near thoſe Places where theſe Tubules are moſt apparent, make an Inciſion in the Skin, and divide it lengthways, which if you perform with Care, you will perceive many ſmall Branches to proceed from a pretty large Trunk; but you muſt be cautious not to cut them, for ſo ſoon as they are bereaved of their milky Juice they diſappear.

CHAP. II.

Of the Muſcles upon the Breaſt.

UNder the Teats lies the *Pectoral Muſcle*, having its Riſe at the *Sternum*, and its Inſertion at the Shoulder. When you are to ſeparate it, you muſt neither begin at its Riſe nor at its End, but at the lower Side under the Armpit. Make a ſlight Inciſion into the Membrane by which it is joined to the *Intercoſtals*, and putting your Finger underneath, ſeparate it by Way of Excoriation. Its Beginning you muſt looſen with your Knife, beginning at the lower Part up to the uppermoſt; then ſeparate it of the *Clavicula*, as alſo of the Muſcle *Deltoides*, unto which it is joined in its Progreſs. After its Separation let it be laid aſide over the Arm. *Galen* makes this a double Muſcle, but it is only ſingle, though there is great Variety to be obſerved in its Fleſh, which Plate-like is laid upon one another. Betwixt this and the Muſcle *Deltoides*, near the Extremity, iſſues forth the Cephalick Vein, which you muſt take Care not to wound with your Knife.

The Second Muſcle is the *Subclavius*, ſeated under the *Clavicle*, as you may gueſs by its Name. It proceeds obliquely from the *Clavicle* to the Firſt Rib, and therefore by an oblique Inciſion you muſt ſeparate its Sides, and afterward from the *Clavicle* and Firſt Rib. In this Separation you muſt beware of the *Axillary Veins*, which lie juſt underneath, for fear you ſhould cut them aſunder.

In the Third Place, there are here no leſs than Forty four *Intercoſtal Muſcles*, partly within, partly without, diſtinguiſhed by the Situation of their Fibres. You muſt make a ſlight Inciſion in the lowermoſt Part of each Rib, following the Tract of the Bone, ſo as that your Knife may not reach beyond one Half of the fleſhy Part, (for this is the only Way I have to limit the Thickneſs, as near as I can, of this Muſcle.) As far as you have diſſected the Fleſh, ſeparate it, ſo as that the Interſtice betwixt the Ribs being laid open, the internal *Intercoſtal Muſcle* may diſcover it ſelf by the contrary Poſition of its Fibres, for that which you diſſected firſt was the external one. The interior Muſcle adjoins to the *Pleura*, which you may ſeparate after the ſame Manner, with this Caution only, not to tear the *Pleura*. The Interſtices betwixt the Cartilages ſeem to have no Relation to the internal Intercoſtal Muſcle, becauſe they have different Fibres.

CHAP. III.

Of the Diſſection of the Thorax.

IN the Diſſection of the *Thorax*, *Galen* did uſe a quite different Method from what is practiſed by our modern Phyſicians, *viz.* he uſed to divide the ſtrong Bone on the fore Part of the Breaſt, by a very ſharp Diſſecting-Knife, in Two Parts, a Thing ſcarce to be put in Practice in a full-grown Body, being a Piece of Work full of Trouble, and uncertain, as *Fernelius* has it. To avoid this, they now-a-days make an Inciſion in the Cartilages adjoining to the *Sternum*, and thus make an Opening into the Concavity of the Breaſt. This may be performed by Two different Ways, *viz.* that the *Sternum* being ſeparated from the *Diaphragm*, remains coherent to the *Clavicle*; or elſe by making an Inciſion in the upper Part, and not to ſeparate it from the *Septum*. The Operation ſucceeds both Ways: In the Firſt, the Ribs and their Cartilages muſt be ſeparated thus: After you have taken off the Membranes, Fleſh, and Fat, endeavour to diſcover the Conjunctions of the Ribs and Cartilages, which you will ſoon diſcern by the Diverſity of the Colour, the Cartilages being white, whereas the Bones are either of a livid or an aſh Colour. After having found the Junctures, have at hand a ſmall Mirtle-like Knife; fix this be-

twixt your Fore-Finger and Thumb, in ſuch a Manner, that the Blade be not above an Inch's Breadth beyond them; then thruſt your Knife next to the Rib into the Cartilage, and cut it aſunder: The ſame Operation takes Place in all the other Ribs, except in the Firſt; for before you can cut out the Firſt Rib, you muſt remove the *Clavicles:* Therefore cut out all the Muſcles which have their Riſe above from the *Clavicles*, and then ſeparate that alſo with a Knife that has neither a Point nor is very broad, making a ſinuous Section (according to their Compoſure) from the *Sternum*; and being thus ſeparated, turn it upward to the Head, which will bring you to the Firſt Rib: But beware of the Branches of the *Subclavia*, for fear, whilſt you are ſeparating the *Clavicles*, you ſhould cut them aſunder, and be forced to ſpend your Time in making Ligatures. The *Clavicle* being laid aſide, you muſt inveſtigate the Conjunction of the Firſt Rib with the Cartilage: (And here it is to be obſerved, that the Firſt Cartilage is longer than the Second, contrary to what is obſervable in all the reſt, where the higheſt Cartilage is always the ſhorteſt) which you will diſcover by its Motion; which done, don't thruſt in your Knife as you did before, but let it ſlide gently along under the Rib, turning its Edge outward, to prevent the wounding of the Subclavian Veſſels. This is a very difficult Operation, and therefore highly to be valued, if performed without injuring theſe Veſſels. After the Separation of the Cartilages, make your Inciſion in the Intercoſtal Muſcles and the *Pleura:* But if you are deſirous that the *Sternum* ſhould remain contiguous to the upper Part, ſeparate it from the *Diaphragm*, *viz.* Lift up the *Sternum* on either Side, and putting a ſmall Knife within the Concavity of the *Thorax*, divide the *Septum* from the Cartilages of the ſpurious Ribs; which Section muſt be repeated likewiſe on the oppoſite Side; and the Membranes of the *Mediaſtinum* being ſeparated from the *Os Xiphoides*, the ſame is laid upwards over the Face.

If you propoſe to begin at the Throat, ſo as to leave it contiguous to the *Diaphragm*, you muſt cut off the Muſcles ariſing from the upper Part of the Bone with a great deal of Circumſpection, for fear of the Veſſels that aſcend to the Head; and then by degrees looſening the Membranes, you muſt lift up the *Sternum*, and ſeparate the *Mediaſtinum* as before, laying the *Sternum* downwards upon the *Abdomen*. If you intend to take the *Sternum* quite away, you may begin at which Place you pleaſe, and proceed with both the beforeſaid Operations. In the mean while you may caſt your Eyes upon the *Mediaſtinum*; for as ſoon as the *Sternum* is taken away, it becomes flaccid. On the *Sternum*, after it is taken off, you muſt take Notice of the Triangular Muſcle, it being ſeated in the Inſide of it.

Galen requires a much larger Opening to take a full View of the interior Parts of the Thorax, and therefore bends the next adjoining Parts of the Ribs to the *Vertebræ* backwards with ſo much Violence, as to occaſion a Fracture in ſome of the Bones; but I ſee no Occaſion for all this, ſince the Aperture made by the *Sternum*'s being taken off at the Ribs is ſufficient for that Purpoſe.

CHAP. IV.

Of the Diaphragm.

IF you propoſe to have an exact View of the natural Poſition of the *Diaphragm*, you muſt do it before the *Thorax* is opened, but after the *Abdomen* is cleared. Thus you will perceive Two Holes, and the Veſſels which are diſperſed through its nervous Part. But when you are to ſeparate it, you muſt begin in the Concavity of the *Thorax*, in the following Manner: Put the Palm of your Hand upon the *Diaphragm* in the Right Side, not far from the Ribs, and ſo preſs it very hard, that ſo the Fibres to which it is faſten'd may be the more extended, and then cut them aſunder with the Point of your Diſſecting-Knife. The ſame muſt be done in the Left Side; for after you cannot preſs it any more downwards with the Palm of your Hand, you may take hold of it, and pulling it hard, the extended Fibres will break to Pieces; but the Proceſſes ſtick much cloſer to the *Spine*, and muſt be ſeparated with much Circumſpection, becauſe under theſe lies concealed the Lacteal Duct, which goes forward to the

Thorax,

Thorax, and therefore muſt be carefully preſerved.

It will be moſt convenient for your preſent Purpoſe to lay aſide the *Diaphragm* upon the Breaſt, and to begin the Diſſection of theſe Proceſſes in the higheſt Part of the *Vertebres*; with this Caution nevertheleſs, not to ſeparate any Part of the *Fat* under which the *Lacteal Duct* may lie concealed. The *Diaphragm* being taken out, is commonly laid open and expanded upon a Table, to be ſhewn to the Spectators.

CHAP. V.

How to diſembowel the Thorax.

IN the firſt Place, the *Anatomiſts* moſt generally expoſe to your View here the Water incloſed in the *Pericranium*, before they go about the Exenteration of the *Thorax*. Therefore take the *Capſulæ* or Involucre of the Heart in your Hand, and make an Inciſion in it with your Knife, to diſcover the Humour contained therein; which you may take out either with a ſmall Spoon, or by removing a little the pointed End of the Heart, ſhew the ſtagnating Liquor in the *Pericranium*. From thence you may proceed to the Anatomy of the *Viſcera*, becauſe the *Trachæa* or Windpipe and Tongue are taken out together with the *Viſcera* of the *Thorax*. A further Separation of the Skin on the Neck muſt be undertaken, *viz.* Make an Inciſion under the Jaw, reaching to the very Chin, and then ſeparate the Skin, according to the uſual Method, up to the Ears. In the ſame Manner take off alſo the *Fat*: But you muſt have a Care of the *Broad Muſcle* of the Jaw, which being very thin, and immediately contiguous to the Fat, muſt be preſerved entire. Next the *Muſcles Maſtodei*, being looſened from the *Sternum*, muſt be ſeparated near their Beginning, ſo that they may be laid on both Sides. You muſt alſo remove a little the *Sternothyrodei*, becauſe they are in your Way, and prevent your coming at the ſubjacent Parts. Both the *Corachyoidei*, which extend obliquely to the Proceſs *Carocides*, muſt be ſeparated and laid over the *Larynx*.

Theſe preliminary Operations being over, and the *Clavicle* removed out of its Station, you muſt begin with the Separation of the *Thymus* from the Sides, where it lies very deep, and ſticks cloſe to the Veſſels. This muſt be done with great Caution, by the Help of a very keen Knife; for fear you ſhould wound the *Cava*, which would occaſion the Blood to iſſue thence. Then clear the *Axillar* Veins and Arteries both of the Fleſh and Membranes, and make two Ligatures in each, at ſome Diſtance from the Trunk. In the ſame Manner you muſt proceed with the *Jugular* Veins, and the Arteries *Carotides*, after you have ſeparated them, (the farther from the Trunk, and nearer to the *Cranium*, the better) and then cut them all aſunder. This is the common Way of proceeding: But in caſe you are deſirous to inſpect the Entrance of the *Lacteal* Duct, you muſt make Ligatures alſo on the Veins of the Left Side, near the Place where the *Aſcendent Trunk* begins to divide it ſelf into Branches; for this Veſſel ends in the Left *Subclavian*, as has been ſaid before.

But becauſe the *Trachæa* reaches up to the *Throat*, in order to take it out entire, you muſt come to the Jaw; and firſt of all the Muſcle *Digaſtoicus*, paſſing thro' the lower Part of the Cheek, muſt be ſeparated from the Fleſh, but not from the Bone; which done, the Muſcles of the Tongue and of the *Os Hyoides* muſt be taken off at the interior Part of the Jaw with the Backſide of your Knife, that no Fleſh remain on the Inſide of the Bone. When you come to the *Tunicle* of the Mouth, make an Inciſion in it near the Teeth of the under *Jaw*; that you may put your Fingers into the Throat and pull the Tongue upwards, in order to ſeparate its Muſcles on the Sides backwards, ariſing from the Bone *Styloides*, by the Help of a long Diſſecting Knife. Whilſt you are doing this, let one of your Attendants pull the lowermoſt *Jaw*, as well as the Head, backwards as much as he can, to further the Operation; which muſt alſo be held ſteady, whilſt you cut out the *Uvula* and the *Gullet*. Neither muſt you upon this Occaſion neglect the Glandules ſeated on both Sides of the Tongue called *Tonſillæ*, or the *Almonds*; but take them out alſo as well as the

the *Nerve* of the Sixth Pair, which deſcends into the *Thorax*.

All this being done, go forward, and ſqueezing the Tongue downwards with your Left Hand, take it out, and with a long Knife, with a good Handle to it, make an Inciſion croſswiſe the Membrane of the Palate, above the *Uvula* or the *Gargareon*; and then fixing a ſmall Hook into the Extremity of the Skin, where the Inciſion was made, near the *Uvula*, pull off and ſeparate the Tunic from its adjacent Parts; by which Means the *Gullet*, and the other contigous Parts, will follow of Courſe, if you take Care only to ſeparate with the Point of your Knife the Fibres by which the *Oeſophagus* is join'd to the *Vertebres*. You muſt continue this Operation till you come to the thin *Vertebra* of the Back, where the Vein *Acygos* branches out of the *Cava*. On this Branch you muſt make two Ligatures, and cut it aſunder betwixt both. This done, move downwards toward the *Abdomen*, and becauſe you will meet in your Way with the intercoſtal Arteries, you may tie them alſo by a Ligature, if you think fit; but if not, cut them away till you have cleared the whole Trunk of the *Aorta*. But whilſt you are intent upon the Separation of the *Oeſophagus*, or of the *Aorta*, from the *Spine*, don't be too buſy with the Fat; for you may be in Danger of impairing or pulling away along with it the *Lacteal Branches*. After you have taken out the *Viſcera*, you muſt alſo ſeparate the *Pleura*, which muſt be done by dividing it with your Knife from the *Vertebres*, which done, you may pull it off with your Hands from the Ribs.

CHAP. VI.

Of the Preparation of the Viſcera *of the* Thorax.

IN what Manner the *Viſcera* contained in the Breaſt, after they have been taken out, may be cleared of their Superfluities, may be rather hinted at than deſcribed; nevertheleſs, I will add here ſomething, to ſhew you in what Order you are to proceed in theſe Preparations. Firſt of all, take away the *Oeſophagus*, becauſe there is no further Occaſion for it here. Then alſo ſeparate the *Thymus* in the fore Part, if it be ſtill there, from the Veſſels. Then remove all the Fat and ſuperfluous Membranes, one by one, and even the *Pericardium* it ſelf, that ſo the *Trachæa* remain free from every Thing except its own Muſcles; and that the Veſſels of the *Heart* being cleared of all that is foreign, may become the more conſpicuous. But here you muſt take Notice of the Connexion of the Trunk of the *Aorta* with the *Pulmonick Artery*, by a certain Duct or Paſſage, which is pervious only in the *Fœtus*, for fear you ſhould cut it aſunder. You muſt take Care alſo not to cut off the Nerve of the Sixth Pair, deſcending along with the *Trachæa*. Now the Anatomy of the Heart comes in of Courſe. This you muſt take in your Hand, and hold it with the pointed End uppermoſt, which you muſt cut off about the Breadth of an Inch, to give you a View of the Diverſity of its *Ventricles* or Concavities. Then diſſect the Right *Ventricle* lengthwiſe, and the Right *Auricle*, where you will find three triangular *Valvules*, not adjoining to the *Cava*, as it is generally believed, but parting the *Auricle* and the *Ventricle*; as alſo certain *Filaments* not unlike Nerves, by which they are joined to the *carneous* Columns; that ſo, whilſt the *Point* recedes from the *Baſis*, theſe *Filaments* being extended, ſhut the Valvules upon the Entrance of the Blood, neither muſt you forget to take Notice of the Diverſity of the *Superficies* of the *Ventricle* and the *Auricle*. After this, you muſt trace by a Style or Stick the *Pulmonick Artery*, (otherwiſe called the *Arterious Vein*) and its Entrance into the Lungs; and then open it with your Diſſecting Knife, in order to get Sight of its three *Demilunar Valvules*.

The Diſſection of the Left *Ventricle* is performed in the ſame Manner, with this Difference only, that at the Entrance of the *Ventricle*, near the *Pulmonick Vein*, it contains two *Valvules* ſhaped like Miters, and near the Artery *Aorta* three more. In the *Fœtus* you muſt alſo obſerve the *Anaſtomoſis*, or Inſertion of the *Vena Cava* and *Pulmonaria*, by the *Oval-hole*, near the Entrance of the *Cava* into the *Heart*, with a *Valve* adjoining to it, to prevent the Return of the Blood. Next to this, don't neglect alſo that

Duct

Duct or Paſſage which is betwixt the *Aorta* and the *Pulmonick* Artery, pervious in the *Fœtus*, ſo that it will admit of a Style; but afterward both the Duct and the Hole is ſtop'd up.

After you have done with the Heart, you muſt come to the Lungs; the chief Thing to be done here being the Preparation of the *Parenchyma*, *viz.* where the *Trachæa* enters the *Lungs* with its Veſſels, we make an Inciſion into the *Parenchyma*, and following the Tract of the *Trachæa*, ſeparate it, where it is obſervable that the *Veins* and *Arteries* keep continually cloſe to the *Rings*. *Highmore* has given us a very exact Delineation of it; but whether he made uſe of the ſame Way of Separation I much queſtion. Furthermore, you muſt inſpect in the *Trachæa* the Circles or Rings, and the *Larynx*, which you will not get Sight of before they are clear'd of their Muſcles.

CHAP. VII.

Of the Muſcles of the Larynx, *the* Os Hyoides, *and the* Tongue.

BEcauſe the *Larynx*, the Bone *Hyoides*, and the Tongue, are coherent to the *Aſpera Arteria*, or Windpipe, we muſt treat of the Diſſection of their Muſcles in this Place. Of theſe there are many in Number, but very ſmall, which is the Reaſon that their Anatomy is much eaſier to be ſhewn than to be repreſented by Words. If therefore you are deſirous to proceed to their Diſſection, you muſt inſtruct your ſelf concerning their Number, Names, and Figures, out of ſome good *Anatomical* Author, (I would adviſe you to *Veſlingius*) and then attempt their Separation in the following Order: Firſt of all ſeparate the Glandules ſeated at the Root of the Tongue, and lay them aſide; and then do the ſame with ſome other *Glandules* adjoining to the *Trachæa*, near the Cartilage *Cricoides*; as alſo with all the uſeleſs Membranes: Then in the fore Part diſſect the *Caracohyoidos*, next that of the *Sternohyoidos*; then the *Cricothyorideos*; and laſtly, the *Thyroarythænoideos* and *Cricoarytænoideos* on the Sides; which two laſt you may ſee even in their natural Poſition.

All theſe Muſcles lie under the Bone *Hyoides*, but above it you will meet with the external *Geniohyoideos*, next with the internal *Geniohyoideos*, or the *Geniogloſſi*; then ſeparate the *Ceratogloſſi* from the Bone *Hyoides*, as likewiſe the *Baſiogloſſi*, and after you have made a Separation of the *Styloceratohyoides* from the *Stylogloſſi* ſeated on the Sides, you may take out the Tongue. Laſt of all, you will ſee alſo the *Arytenoidei* and the *Cricoarytænoidei* backwards; but to ſeparate them would be ſuperfluous

Now you muſt come to the Preparation of the Tongue, that you may take a View of its *Nerves*, *Veins*, *Arteries*, and four Pairs of Muſcles; firſt, you muſt ſeparate the *Styloglo ſſus* ſeated on both Sides of the Tongue, and next to this the *Myloglo ſſus*, diſtinguiſhable from the former only by the Poſition of its Fibres. After this, the *Ceratoglo ſſus*, and laſt of all the *Baſioglo ſſus*, reſting on the middle of the Tongue. The Veins and Arteries you may ſeparate at firſt Sight, to view the Branching out of their ſmall Channels, very delightful to behold. This done, make an Inciſion croſsways in the *Tongue*, in order to examine its Subſtance which is very ſoft.

LIB. III.

Of the HEAD.

CHAP. I.

Of the Integuments of the Head.

THere are Five ſeveral Integuments of the Head; *viz.* the Hairs, the Skin, the *Perioſteum*, the *Pericranium*, and the Skull. We told you before, that all the Hairs on the Body muſt be ſhaved off; and the ſame Thing is to be done on the Head.

The Inciſion in the Skin muſt be made in the Shape of a *Latin* X. Begin at the Root of the Noſe, croſs the *Vertex* or Crown of the Head, and ſo down to the Neck; the other muſt begin near the Ears, in the Proceſs *Maſtoideos*, and terminate in the ſame Place on the oppoſite Side. Take Care your Knife don't cut beyond the Skin, and cut the *Pericranium*. The Skin, after its Inciſion, is ſooner taken off here than any where elſe, becauſe there is no Fat underneath it; and

and if any be, it muſt be taken off at the ſame Time with the Skin, becauſe here are the Roots of the Hairs. However, in ſome Places are ſome ſmall ſubjacent Muſcles, which muſt be taken Care of, eſpecially on the Front behind the Ears; on the Noſe, Mouth, and Eyes, wherefore you muſt proceed here with Circumſpection.

The Skin being taken off, and laid aſide, you muſt alſo make an Inciſion in the *Pericranium* in Form of a Croſs; but this muſt be performed with a light Hand, for fear of wounding the *Perioſteum*. The *Pericranium*, after its Diſſection, you may lift up gently, and ſeparate with your Knife the *Fibres* from the *Perioſteum* as far as you think it convenient.

Laſtly, you muſt alſo make your Inciſion in the ſame Manner as before in the *Perioſteum*, and looſen it with the Backſide of your Knife from the *Cranium*; for if you would keep it entire, you muſt proceed gently; for it will not be managed with Violence, and will ſoon break. The Diſſection of the Skull will be ſhewn hereafter.

CHAP. II.

Of the Muſcles of the Face.

THE firſt of all are the Muſcles of the Forehead, which if the Skin has been taken off as it ought to be, will be obvious to your Eyes. Theſe you muſt ſeparate from the *Cranium*, and begin at the upper Part, till you come to the Concavity of the Eye. The other Muſcles of the Face muſt alſo be laid open before you can diſcover their Poſition. You muſt therefore take off the Skin, by making an Inſection thro' the Back of your Noſe, and the midſt of the Lips, which you muſt afterwards ſeparate with a great deal of Caution, for fear of hurting the Muſcles that lie cloſe under it. When you take off the Skin of the Eyelids, don't meddle with their Hairs, that ſo you may take Notice of the *annate Tunic*. After the Separation of the Skin, you will ſoon diſcover the *Orbicular Muſcle* of the Eyelids, which requires no further Diſſection (unleſs it be to ſeparate it in the lowermoſt Part from the Bone) no more than the triangular Muſcle ſeated on both Sides of the Noſe. All the other Muſcles belonging to the Noſe are ſo very ſmall, that they are ſcarce diſcernable, unleſs it be ſuch as have exceſſive large Noſes. Before you enter upon the Diſſection of the Muſcles of the *Lips*, you muſt firſt remove the Fat that lies interſperſed there with all poſſible Dexterity, to avoid doing any Injury to theſe ſmall Muſcles. There are two of them that lift up the Lips; one ariſes from the Cheek, the other from the *Os Jugalis*, called *Zygomaticus*, by *Riolan*. Under theſe lies concealed a pretty broad Muſcle, which compoſes the Mouth called the *Buccinator*; and the Mouth it ſelf is incloſed by the *Sphincter*, eaſily diſcovered by his circular *Fibres*. In the fore Part of the Jaw are a Pair of Muſcles which draw back the under Lip. We need not enlarge any further upon this Operation, it being very eaſy to be performed, provided you will follow the Tract of the Fibres, which will prove ſuch ſure Guides to you, that you can't well miſtake in the Diſſection.

CHAP. III.

Of the Muſcles of the inferior Jaw.

TO promote Manducation, the inferior Jaw has been provided with Muſcles; of which I will ſpeak next, becauſe before the *Cranium* can be opened, the Muſcle *Crotaphites* muſt be removed from its Place. Firſt of all then ſeparate in the Neck the *Broad Muſcle*, as it is ſtyled by *Riolan*, ſo that only ſome ſlender Part of it remain adhering to the Extremity of the lower Jaw, where it ends. Next you muſt make a Separation alſo of the Muſcle *Maſſeter*, ſeated in the hindermoſt Part of the Jaw, after having removed the *Great Glands* under the Ears from the fore Part of the Bone. This you muſt do by ſhaving off gradually with your Knife, ſo that it remain hanging down the Jaw.

This done, you muſt come to the *Temporal* Muſcles, Part of which lie underneath that you have diſſected laſt; but the *Os Jugale* muſt be removed firſt, before you enter upon the Diſſection of this Muſcle.

Then divide the *Os Zygomaticum* twice aſunder croſswiſe, by the Help of your Saw, once

once near the Eye, and then again at the Proceſs called *Maſtoideus*. That Part which is ſeparated from the other Part of the Bone, muſt be divided from the Muſcle by the Diſſecting Knife, and then laid aſide. After this you muſt ſeparate alſo with your Knife the *Temporal Muſcle* from the Skull; but take Care not to injure the Bone of the Temples, becauſe it is ſpread over the Bone of the hindermoſt Part of the Head like thin Plates or Scales. If you ſeparate the Muſcle from the *Cranium*, it will ſtill be coherent to the *Corona* of the under Jaw, that being the Place of its Inſertion.

Now you muſt divide the under Jaw with a Saw in the Chin, ſo that it paſſes thro' this Jaw-bone betwixt the Teeth called *Inciſores*. After this pull the Jaw aſide, which will give you a View of the Muſcles, extending it ſelf from the interior and inferior Part of the Bone backwards. This Muſcle is called the *Digaſtricus*, and paſſes through the *Stylocerato-hyoideus*, of which we have ſpoken before. You muſt ſeparate it from the Bone with the Point of your Diſſecting Knife, and then cut it off of the Bone *Styloides*; *Bartholin* calls it *Graphyoideos*. If the Head be ſeparated from the Trunk of the Body, there will be no Occaſion for the Diſſection of the Jaw; becauſe if then you turn the Head upſide down, you may perform this Operation with a great deal of Eaſe, provided you have taken Care to remove before-hand the Muſcles of the Neck and Head. There are ſtill remaining the *Pterygoidei*, *viz.* the external and internal one; they differ only in their Origin, but not in their Progreſs and Inſertions, becauſe the laſt has its Riſe from the exterior, and the other from the interior Part of the *Pterygois*. In their Diſſection therefore you attend only to their Separation, *viz.* after you have taken off the *Crotaphites*, you muſt take out alſo the *Jaw-Bone*, and then ſeparate from the *Jaw* the external one ſeated cloſe to the Jaw, and being much leſſer than the other internal one, which, after this is removed, you will ſee adjoining to it on the Inſide of the Jaw, and may ſeparate it in the ſame Manner as the Muſcle *Maſſeter*.

CHAP. IV.

Of the Diſſection of the Cranium, *or Skull.*

THE Opening of the Skull Bone is performed by different Ways: The Ancients made uſe of another Method, called now a-days the *Vulgar Diſſection*; and thoſe that follow the Footſteps of *Conſtans Varelius* another, which from the Author thereof, is called the *Varelian Diſſection*. I will here ſpeak Firſt of all concerning the Firſt, and then add ſomething of the Laſt. Above all, in order to make an equal and ſtrait Diſſection, you muſt tie a double Thread round the Head very ſtrait and even. Let this Thread be faſten'd round the Forehead, a little above the Hollowneſs of the Eyes, and ſo round the Bones of the Temples, the *Sutura Lambdoides*, ſo as to be at two Fingers Diſtance from the Extremity of the *Sagittalis*, and from thence directly round the Bone of the Temples of the oppoſite Side, above the Concavity of the other Eye.

Having thus faſtened your double Thread about the Head, make with your Diſſecting Knife, which muſt be very ſharp, an Inciſion betwixt the two Threads to the Bone, that may ſerve you as a Mark or Line, whereon then make your Diſſection with a Saw: But the Head being round, you muſt have an Attendant to hold and keep it ſteady during the Operation.

After this ſlight Inciſion, take away the Threads, and with a Saw, ſuch as the Chirurgeons make uſe of in the Amputations of gangren'd Members, cut aſunder the Skull. Perhaps you will expect I ſhould here preſcribe you certain Rules how deep the Saw is to enter; but as the Skull is not of the ſame Thickneſs in all Bodies, nay not even in all its Parts, 'tis very difficult to confine you to any certain Rules: But this you ought to take Notice of, not to manage your Saw with Violence, but draw it forward and backward gently, and take it out now and then, to try with your Knife, whether the Saw has

has enter'd the *Cranium* or not; if not, you muſt continue your Operation till it has, which you may diſcover by the Sound. Go on thus in this Diſſection round the Skull, (ſtill following the Tract of the Line made by the Knife) till you come to the ſame Place where you had fixed your Saw at firſt. But becauſe on ſome Parts of the Head the *Cranium* cannot ſo conveniently be open'd by a ſtreight Saw, for fear of hurting the *Meninges* and the Brain, I love rather to make uſe of a Saw inclining to a Demilunar Figure; but this I leave to every Man's own Diſcretion.

This Operation with the Saw muſt be performed not by one ſingle Perſon, but by Two at leaſt, *viz.* one who puſhes the Saw forward, and the other who draws it backward; for by this Means the Saw will go through more ſteady, eſpecially if it happens to be of a pretty large Size, when it is ſcarce to be managed with that Exactneſs as it ought to be by one Perſon. The Bone of the *Calvaria*, after its Inciſion, muſt now be ſeparated thus: Thruſt a ſtrong broad Iron *Spatula* ſideways within the *Fiſſura*, or Opening, ſo that if one Part or other of it be not quite cut aſunder, you may ſplit the *Calvaria*, and break the ſtrong Fibres by which the Membranes are join'd to the *Cranium:* For though the Bone of the *Cranium* be cut through, you muſt not expect the *Vertex*, or Crown of the Head, to come off a-courſe, becauſe, by reaſon of its firm Connexion to the *Dura Mater* by the Membranes and Veins, it cannot be cleft aſunder without ſome Strength and Violence.

If the Head is to be diſſected for a publick Anatomy, the niceſt Way to perform this Operation is by leaving it to the Trunk, and perform the Diſſection with the Saw after the common Way, whilſt the Head remains ſtill on the Body, but not after the Methods preſcribed by *Varelius*. The *Vertex*, or Crown of the Head, muſt be taken hold of and held up by one of your Attendants.

The Second Way, the Inventer whereof (as we told you before) was *Varelius*, is performed in a different Manner; for he ſeparates the *Calvaria*, ſo as to expoſe to your View firſt of all its under Parts, where are the Origins of the Nerves. It is done thus: Take off the Muſcles of the Forehead, Neck, and Head, ſo exactly, as to leave not any of the carneous Fibres behind; then ſeparate the Head from the *Vertebræ*, after you have cleared this alſo of the Fleſh; then bending the Head forward, you muſt cut aſunder the *Medulla Spinalis*, diſjoint the Bones, and cut off the Membranes that are coherent to them: Then take out the Eyes; of which, more in the 8th Chapter. This done, you muſt begin with your Saw, in the ſame Manner as before, except that you are to fix it in on another Place; this being the main Difference betwixt this and the preceding Diſſection of the *Cranium*. Fix therefore your Saw at the Root of the Noſe, and move it to and fro croſswiſe through the Circles or Concavities of the Eyes, above the mammillar Proceſſes to the *Occiput*. If you can hit the ſuperior *Lamina* of the Circle, the Operation is exactly done, but if you cannot do ſo, make an Inciſion with your Knife, and then on both Sides of the before-mentioned Proceſſes make another Inciſion, ſo that it reaches to the *magnum Foramen* of the *Occiput*. The *Cranium* being thus diſſected, put your Finger, or a ſmall Hook, into the foremoſt and lower Part of it, and lifting it up, ſeparate the *Dura Mater* with your Knife from the Bone; but if you find that too troubleſome, diſſect the ſaid Membrane at the ſame Time with the *Cranium*, and cut off all the Nerves, Veins, and Arteries cloſe to the Bone, and then pull off the lower Part of the *Cranium*. He that is deſirous to be further inſtructed in this Operation, may conſult *Spigelius*, *Fabr. Corp. Hum.*

But it is to be obſerved, That in this Diſſection the *Cranium* is rendred altogether unfit for Oſteological Demonſtrations. 'Tis for this Reaſon that I am rather for the Firſt Anatomy of the Head, which, with a ſmall Variation, diſſects the Bones of the *Vertex* in ſuch a Manner, that the *Cerebrum* may be taken out, and ſhewn on the oppoſite Side. The whole Difference conſiſts in this; that in the former circular Diſſection of the *Cranium*, the Operation is performed juſt above the Concavities of the Eyes, which from thence is continued in the *Occiput* to the *Foramen* that affords a Paſſage to the *Medulla*.

The upper Part of the Skull being taken off, you must separate the *Dura Mater*, as shall be shewn in the next following Chapter: Then lift up the Proeminency of the *Cerebrum*, and cut off first the Point of the *Falx*; then the *Nervi Visorii* and *Moterii* of the Eyes next to the Bone, and so go on with the rest. You may also sometimes lift up the *Cerebrum* either on one or perhaps on both Sides, and then separate or cut off the Nerves dispersed through the lateral *Foramina* of the *Cranium*. Lastly, the hindermost Part of the *Cerebrum* must also be lifted up, and the *Falx* being put a little aside, the *Dura Mater*, which divides the *Cerebellum* from the *Cerebrum*, must be dissected with your Knife. You must begin this Section at the *Falx*, and carry it on to the *Occiput*. If it be not big enough, widen it by a decussate X Incision. After all, put in a broad *Spatula* gently near the *Cerebellum*, in order to take it out, and cut asunder all the Nerves that were not dissected before. Thus you will have the whole *Cerebrum* removed entire; which you may further prepare afterwards according to the *Varolian* Method; as shall be shewn hereafter more at large in the Seventh Chapter.

CHAP. V.

Of the Dissection of the Meninges *of the* Cerebrum, *or of the* Membranes *of the* Brain.

THE *Cerebrum* has Two *Membranes* or *Meninges*, call'd the *Pia* and the *Dura Mater*; but the last is the Subject only of Anatomy, the first, by reason of its streight and immediate Connexion with, and its various Insinuations into the *Cerebrum*, being impossible to be separated from it. Its Thickness and Substance appears to your Sight immediately after the *Cerebrum* is taken out, because it is extended not unlike a Cobweb round the Origin of the Nerves.

'Tis therefore the *Dura Mater* only that here falls under our Consideration, in which you may at first Sight take Notice of that vast Number of small Veins from whence you see the Blood issue whilst you are taking off the Skull.

When you discover these Veins, begin your Dissection, and with your Knife make an Incision into the *Dura Mater* near its Middle on both Sides, (but not exactly in the Middle where the *Falx* is:) Into the Hole convey a sharp-pointed Pair of Sissars, and separate both the fore and hindermost Parts as far as you can: The same Operation you must reiterate on the other Side, and after this make another Incision, reaching to the Ears, and then lay aside the Four divided Parts of the Membrane.

The *Cerebrum*, or Brain, is divided into Two Parts by the *Falx*, arising from the duplicate Membrane call'd the *Dura Mater*. In the foremost Part it is joined to the *Crista Galli*, from whence it must be separated; and after having torn asunder the small Veins by which it is joined to the *Cerebrum*, lay it on one Side toward the *Occiput*, whilst you are busied in the Preparation of the *Cerebrum*; (of which, more hereafter.) This done, you must trace the *Sinus's* of this Membrane, of which, you will meet with Two in the *Falx*, *viz.* the lowermost and lesser, and the uppermost, being the bigger of the Two, extending to the *Torcular*.

Dissect this *Falciform* or *Sythe-like* Membrane at the Extremities of each Side by a somewhat oblique but oblong Incision, and trace its Progress by putting a Style within it, which when you have found out, open it either with your Knife or with a Pair of Scissars. If you dissect the inferior or lowermost in the Middle, and by the Help of a hollow Pipe, or *Tubulus*, blow the Air toward the fore Part, you will find certain Divarications or Branches proceeding from the inferior *Sinus* to the superior, because they are visibly extended by the Immission of the Air. The uppermost *Sinus* continues its Course till it meets with the rest, and so makes up Part of the *Tortular*; therefore you must keep to this, and following the Trace of the Style, (without going in the least astray in your Incision) this will lead you to Three other *Sinus's*, one that goes toward the *Foramen Inios* in a direct Line for some small Space with the former; the other Two are seated on the Sides oppo-

ſite to one another, and muſt be ſeparated with the Knife like the *Sinus* of the *Falx*. After having traced their Extremities, you will find them to end in the external Jugular, ſo that theſe Concavities ſeem to be nothing elſe but certain Dilatations belonging to the Jugular Veins, which hereabouts degenerate into Membranes.

'Tis further to be obſerved concerning the *Dura Mater*, that the ſame does not ſtick ſo cloſe to all the Parts of the *Cranium* or Skull as it does to ſome; for on the upper Part being joined to it only by ſome ſmall Veins and thin Fibrils, as it is likewiſe ſo on the Sides and to the *Occiput*, it is eaſily taken or pull'd off: But toward the lower Part and the *Os Sphænoides*, it is ſo firmly agglutinated, that it is impoſſible to ſeparate or pull it off without breaking it in Pieces.

CHAP. VI.

Of the Vulgar Anatomy of the Cerebrum.

THE modern Anatomiſts perform the Diſſection of the *Cerebrum* by Three different Ways; for ſome begin at the Origin of the Nerves, after *Varolius*; others begin at the upper Part, and diſſect either the whole *Cerebrum*, or elſe one Side of it only, according to *Sylvius*. The moſt common Method is thus: Firſt of all ſeparate the *Falx* from the *Criſta Galli*, and then from the Sides of the *Cerebrum*, and ſo lay it backwards toward the Neck; then with one Section with a broad but ſmall Razor cut away a Piece from the *Cerebrum* about the Bigneſs of Two Inches, ſo that your Section or Inciſion may reach to the Ventricles or Concavities, which being ſeated ſomewhat deep in the back Part of the Head, you muſt make your Inciſion alſo deeper on that Side; which done, you will immediately obſerve thoſe very ſmall Veins and Arteries, which lying diſperſed through the Subſtance of the *Cerebrum*, will diſcover themſelves by and reſemble to ſo many reddiſh Points: But if you find theſe not appear as yet, you muſt make another Inciſion, and ſo by Degrees cut away theſe ſmall Particles till you come to the Ventricles, which will make their firſt Appearance in the fore Part of the *Cerebrum*, becauſe there they are placed ſomewhat higher. If by making a tranſverſe Diſſection, you diſcover a ſmall Opening or Hole, trace its Progreſs as well toward the Front, as to the back Part of the Head: That Part which proceeds toward the Front, ends at about Two Inches Diſtance from its Extremity; but in the hindermoſt Part it turns again toward the Front. Firſt of all it makes a Kind of a Concavity like a *Proceſſus* in the *Occiput*, or hindermoſt Part of the Head, from which it is diſtant about an Inch, leſs or more: Then it turns backward near the outſide toward the fore Part, and near the Bone of the Temple declines about an Inch's Breadth only. It alſo takes its Courſe deeper and deeper, ſo that above the *Os Petroſum*, near the Extremity of the Auditory Nerve, where the Ventricle ends, the Brain under the Ventricle does not exceed a Pea in Thickneſs. Hence it is, that you muſt cut away a much larger Portion of the *Cerebrum* on the Sides than near its middle Part where the *Falx* is placed; for under this *Falx* lies the *Fornix* or Arch, or that white Subſtance, which being fixed not unlike a Bow or Arch above the Third Ventricle, divides the lateral Ventricles: This you may cut away, if you thruſt your Knife pretty deep into the middle Part of the Subſtance of the *Cerebrum*, and cut away the greateſt Part of it. That Part which is in the Middle, betwixt the Sides of each Ventricle, and as it were incloſed by the circumambient Ventricle, is called the *Corpus Calloſum*, into which is joined at the Sides the *Plexus Coroides*, ariſing in the Extremity of the Ventricle from the *Arteria Carotidis*, with ſome adjacent Glandules, and taking its Courſe round the *Corpus Calloſum*, receives a Branch of the *Cervicalis*. Make your Inciſion at its Origin, and there with the Point of your Knife ſeparate it from the Ventricle, and you will underneath it diſcover a ſmall Artery, which ſpreads its Branches in a delightful Manner through the Superficies of the Ventricle. Now liſt up the *Fornix*, where you will meet with the *Septum Pellucidum*, being the lowermoſt Part of the *Fornix*. Then cut away the *Carnis* in its fore Part, and lay it aſide toward the *Occiput*, which will afford

ford you a full View of the Two hindermoſt *Crura*, which creep along the lateral Ventricles. Under the *Fornix* you will find the Third Ventricle, which may be called the Concourſe of the lateral Ventricles. This Ventricle has Two Openings, one in the fore Part, near the *Infundibulum* and the pituitary Gland, commonly call'd the *Vulva*; the other in the hindermoſt Part, tending toward the Fourth Ventricle, call'd by ſome the *Anus*, having at each Side a Protuberancy call'd the *Teſtes*; and above it is the *Pintalis Glandula*, ſo much extoll'd by *Des Cartes* above the reſt, eaſily diſcernable by its Aſh-Colour. 'Tis call'd *Penis* by ſome, but very improperly. Hereabouts are alſo Two other Protuberancies, call'd the *Nates*. After you have taken a View of all theſe Parts, you muſt direct your Style into the Fourth and moſt Noble Ventricle, which goes downward, and following the Tract of the Style with your Diſſecting-Knife, open your Way into the *Cerebellum*, till you come to the ſaid Ventricle. After having viewed this Ventricle, you muſt come back again to its fore Part, and lift up gently the Proceſſes of the *Cerebrum*; and firſt of all ſeparate the mammillar Proceſſes from the *Os Cribroſum*, and then gently lift up the *Cerebrum*, that ſo you may ſeparate alſo the Nerves ariſing within the *Cranium* in their due Order. Firſt of all begin with the Optick Nerves, betwixt which and the next Pair you will find the *Carotides*, which diſperſes its innumerable Branches through the thin Membrane. This you muſt take away alſo, and, if poſſibly you can, the *Pituitary Gland* alſo, which paſſes through the *Meninx* under the *Optick Nerves*. After this you muſt cut away the *Nervi Motorii* of the Eyes, and then a ſmall Nerve proceeding to the Tongue, and another immediately after, which likewiſe goes to the Tongue, and tranſcends the *Os Petroſum*: After theſe the *Auditorium*, and next the *Vagum*; which Nerve ſpreading it ſelf into many Filaments near the Ingreſs of the Jugular, comes out through the Skull: And laſt of all, the Seventh Pair of Nerves, which near the *Spinalis Medulla* comes out of the *Cranium*. When you are going to cut aſunder theſe Nerves, take Care you do not pull out the *Cerebrum* with too much Violence, for fear of tearing aſunder the Nerves, which are more tender near this Origin than in their Progreſs. The next Thing you are to take Care of is to cut them off next to the Skull-Bone, and not to break any of the Fibres; for, as we told you before, there are ſome Nerves that divide themſelves into many Filaments before they go out of the *Cranium*.

After having taken a full View, and examined all theſe Things, you muſt come again to the *Occiput*, where you are to take out the *Cerebellum*; to effect which, you muſt lift up a little the *Cerebrum*, and then make Three Inciſions with your Diſſecting-Knife into the Membrane in which it lies incloſed, *viz.* one in a ſtreight Line to the *Occiput*, and the other Two croſswiſe to both Sides; but take Heed not to cut to the Bone, for fear of ſpoiling the *Sinus's* of the *Dura Mater*. Within this Incloſure is placed the *Cerebellum*, and therefore not to be viewed exactly without its being taken out thence: Wherefore you muſt put in at one Side of it either a broadiſh *Spatula*, or a broad Spoon, and ſo take it out of the Membrane. Underneath it you muſt not forget to obſerve the *Proceſſus Vermiformis*, ſeated at the Root of the *Spinalis Medulla*, betwixt Two Globules of the *Cerebellum*, on whoſe Sides are Two and ſometimes more Protuberancies, call'd the *Bridge* by *Varolius*. Laſt of all, after having taken away the *Spinalis Medulla*, remove alſo the *Cerebrum*. This is the common Way of diſſecting the *Cerebrum* or Brain.

CHAP. VII.

Of the Preparation of the Cerebrum, *according to* Varolius *and* Sylvius.

Conſtantius Varolius, as he was the Inventer of a new Way of opening the *Cranium*, ſo he was the Author alſo of a different Method of diſſecting the *Cerebrum*: For after having diſſected the *Cranium*, he takes out entire the *Cerebrum*, and turning it upſide down, begins his Section on that Side where the Nerves have their Origin. I told you before, That *Varolius*, in his Diſſection of the Skull, renders it unfit for the framing of a Skeleton, and makes the whole

Operation more difficult, ſince the *Cerebrum* may be taken out entire as well after the circular Diſſection of the *Cranium*, as repreſented before in the Fourth Chapter; and that this Operation may be performed with the more Exactneſs, you may put the *Cerebrum*, turn'd upſide down, into the Inſide of the *Os* of the *Vertex*.

By this Method of diſſecting the *Cerebrum*, you will be enabled to make divers moſt curious Obſervations, far beyond what could be expected in the preceding. The Firſt Thing that falls under your Conſideration there, is the *Fiſſura* of the *Cerebrum*, which divides it into ſeveral Parts. To trace its Extremity, you muſt with the Point of you Knife cut aſunder the ſmall Branches of the Veins which lie interſpers'd there. The next is the *Pia Mater*, which you ſee here ſeparately extended over the Nerves like a Cobweb, and perforated in many Parts. Tear it aſunder, and you will ſoon diſcover the *Anaſtomoſis* or Inoſculation of the *Carotides* and *Cervicalis*, by Means of a ſmall Branch, which you muſt cut aſunder. You muſt alſo take a View of certain ſmall Veins, or rather Fibres, which lie diſperſed here, and have their Riſe from the *Carotides* and *Cervicalis*, and are beſt to be ſeen when moſt extended. This Contexture of Filaments is called the *Rete Mirabile*. Here you may alſo obſerve the *Cervicalis Arteria*, being contiguous to the *Spinalis Medulla*, and ſplit as it were aſunder at its Origin in the Shape of the *Greek* Letter Υ. Next take Notice of the *Pituitary Gland*, (though the beſt Part of it commonly is left behind within the *Cranium*) and of the *Infundibulum*, which lie upon the Optick Nerves at their Conjunction. You muſt ſeparate them from theſe Nerves, that ſo you may find out the Hole or Opening into the Third Ventricle. If you cut the Optick Nerves in the Middle, you will find that there is not only a brave Conjunction, but alſo an abſolute Connexion betwixt them; and if you can, you may inveſtigate their Concavities. Next to this you muſt trace the Ventricles thus: Look for that Branch of the *Carotides*, which, together with the Optick Nerve, enters the Subſtance of the *Cerebrum*, which will lead you to the Extremity of the lateral Ventricle; for both the Branch of the *Carotides* and the Optick Nerve, as *Riolan* has very well obſerved, enter into the Ventricle, and the laſt creeps along the Sides near the *Corpus Calloſum*. But you cannot as yet have a full View of the whole Ventricles, by Reaſon of the *Crura Anteriora*, or anterior Divarications of the *Spinalis Medulla*, and therefore muſt ſtop here a little, and proceed thither by the Way of the Fourth Ventricle: Therefore lift up the *Medulla Prolongata* very gently, and ſeparate it with the Point of your Knife from the *Cerebellum*; and here you will meet underneath with the *Proceſs. Vermiformis*, and the *Pons* or Bridge: After this you may without the leaſt Obſtacle come at that noble Ventricle, the Inſide and hindermoſt Part whereof exactly reſembles the Cavity of the *Uterus*. If you lift up ſomewhat higher the *Spinalis Medulla*, you will diſcover a Perforation in this Ventricle, which goes into the Third, reſembling in Shape a Writing Pen, and thence called the *Calamus Scriptorius*. Put your Style gently through this Opening, and then with your Knife cut aſunder the *Spinalis Medulla* in the Middle, where Nature it ſelf has chalk'd out the Way by an Interſtice, which divides it in Two Parts by a rediſh Line. After you have made this Diviſion, you will ſoon get Sight of the Third Ventricle, which you muſt diſſect with your Knife, and then you will behold the whole Concavity, the *Septum Pellucidum*, the *Fornix*, and the Paſſage to the lateral Ventricles. After having made your Obſervations here, cut away the *Crura*, or Divarications of the *Spinalis Medulla*, which proceed to the *Cerebrum*, and lay them aſide, together wieh the *Cerebellum*; which done, you will have an Opportunity of making an exact Obſervation of the Shape and Figure of the lateral Ventricles, which in Effect ſomewhat reſemble a Horſeſhoe, were it not for the Proceſs in the Middle.

Then leaving the *Cerebrum*, diſſect the *Cerebellum*, beginning on that Part where the *noble Ventricle* has certain ſmall *Sinus's*. If you make your Diſſection here exactly in the Middle, you will, beſides theſe ſmall Branches coming from the *whitiſh Medulla*, diſcover in this white Body a different Colour inclining to a yellow, repreſenting in Shape a Hand cloſed together without the

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Little Finger. The *Laminæ* of the *Cerebellum*, after you have ſeparated the exterior Tunicle ariſing from the *Pia Mater*, may be ſeparated alſo from one another with the Back of your Diſſecting-Knife.

We muſt now proceed alſo to another Method different from the former, the Invention whereof is owing to the Learned *Sylvius*, *viz.* He only diſſects one Half of the *Cerebrum* after the common Way, and the other on the oppoſite Side. Certainly nothing could have been more conveniently deviſed in this Kind than this Way, becauſe thereby it diſcovers to our View all thoſe Parts which are beſt to be ſeen on the undermoſt Side of the *Cerebrum*, and at the ſame Time does not neglect what ought to be ſhewn on its upper Part. You may here proceed in the ſame Manner as has been ſaid in the Two before-mentioned Methods, if jointly conſidered, one Side being to be diſſected after the common Way, and the other to be taken out and diſſected on the oppoſite or under Side. Nevertheleſs ſome ſmall Difference there is in Relation to the Firſt Way of diſſecting the *Cerebrum*, becauſe here you have but one Part of it to manage; wherefore we muſt add a few Lines to ſhew wherein this Difference conſiſts.

There is not the leaſt Difference in the finding out of the Ventricles, except that you muſt not ſeparate the *Falx* neither from the Bone nor the *Cerebrum*, unleſs it be on one Side only, but ſo as to let it keep its natural Station. After you have diſcovered the Ventricle, you proceed in all Reſpects as before, till you come to the *Fornix*, where you muſt neither cut off its *Crus*, nor lay it backwards, but lift it up only, ſo that you may take a View of the Third Ventricle, and make your Obſervations as before. You have nothing to do now with the Fourth Ventricle; but your Buſineſs is to take out the *Cerebrum*: Therefore lay the remaining Half of the *Cerebrum* on one Side, that ſo you may diſcover the Origin of the Nerves; which being ſeparated, take out the *Cerebrum*, and perform your Operation in the under Part, according to the Method given before in this Chapter; the ſame being altogether ſuch, as requires not any farther particular Direction.

Thus you have here a threefold Method of anatomizing the *Cerebrum*, ſuch as is practiſed among moſt of the learned Anatomiſts now-a-days; out of which you may chuſe that which you like beſt: But if I am to give you my Opinion, I am for the laſt, and give it the Preference far before the reſt: But this I leave to every Body's own Judgment, and proceed now to other Matters.

CHAP. VIII.

Of the Anatomy of the Eyes.

THE *Eye* being one of the nobleſt *Organs* of our Body, is, for its greater Security, encloſed within a bony Concavity, and ſecured by divers Fences. On the Outſide it is covered by the Eye-lids, the Extremity whereof being ſomewhat hard, is called *Tarſus*, within which are fixed the Hairy Eye-laſhes. The *Orbicular Muſcle* makes up Part of the Eye-lids; of which we have ſpoken before in the Second Chapter. If you lift up theſe Hairs, you will diſcover the *Tunica Albuginea*, containing many ſmall Veins, which are conſpicuous in thoſe that die by the Rope, but not in thoſe that are executed by the Ax or Sword. 'Tis alſo call'd the *Adnata*, and ſerves to keep the globular Eye within its Concavity. But the Eye being thus fixed within its bony Concavity, the taking of it out thence requires both a dextrous and induſtrious Operator.

It is performed by Two different Ways, either when the *Cranium* is entire, or after it has been diſſected: The firſt is the moſt difficult, but nevertheleſs moſt generally made uſe of: The laſt is put in practice when we propoſe to inveſtigate the natural Poſition and Origin of the Muſcles of the Eye, and the Extremity of the *Optick Nerve*; to accompliſh which, I will give you the following Directions:

After you have taken off the Muſcles of the Front and Eyelids, and opened the *Cranium*, ſeparate the Eyelid from the Eyebrow on the bony Concavity, as likewiſe the *Perioſteum* where it adheres to the upper Part of it: But you muſt beforehand alſo diſſect the *Cerebrum*, becauſe otherwiſe its Proceſſes

Proceſſes will hinder your Operation, therefore you muſt ſeparate it at the Optick Nerves. After this, you muſt cut aſunder with a Saw the Remainders of the Bones of the Forehead, which muſt be done at twice; for you muſt fix your Saw firſt above the *Canthus Major*, and next above the *Minor* or leſſer *Canthus*. Whilſt you are making uſe of the Saw, let the Eye be preſs'd downwards, and toward the oppoſite Corner, for fear it ſhould either be torn to Pieces, or elſe be in your Way. The thickeſt Part of the Bone being cut away with the Saw, you may diſſect the thinner *Lamina* of the Bone juſt above the Eye with a ſtrong Knife, and take it away, and then you will ſee the Eye entire, without any Incumbrance, except that you muſt alſo clear it of the *Perioſteum*, as alſo of the Fat, but by Degrees, till none of is it remaining behind. Here you muſt have a peculiar Regard to the ſuperior Muſcle, which moves the Eye in an oblique Line, commonly call'd the Muſcle of the *Trochlea*, for it paſſes through the Cartilage adhering to the upper Part of the interior *Canthus*, which you muſt take Care not to diſplace. After you have taken a View of the natural Situation and Origin of the Muſcles near the Optick Nerve, it will be no difficult Task to pluck out the Eye from its Seat, by cutting aſunder the Optick Nerve, as well as the *Nervus Motorius*, and the Eyelids.

But the greateſt Difficulty is in the ſeparating it from the *Canthus* without impairing the Bones; which being to be performed with the utmoſt Caution, take the following Directions: After you have cleared the Eye from the upper Bone, pull it out gently downwards, which done, ſeparate the *Perioſteum* with a bluntiſh Knife from the Orbit, in ſuch a Manner, that the *Trochlæa*, ſeated on the upper Part of the interior *Canthus*, be removed at the ſame Time; for unleſs you proceed with a great deal of Caution, it is eaſily loſt. In the greater *Canthus* you muſt alſo take away the *Caruncula Lacrymalis*, or *Lacrymal Gland*, which is oftentimes very ſmall, together with the Eyelids. Nor muſt the other Gland in the leſſer *Canthus*, being ſomewhat larger, and a Compoſition of many other Glands, be left behind; of which you need not ſtand in Fear, if you have ſeparated the *Perioſteum*, as I told you before. The Eye being thus free and clear on all Sides, you muſt now take it out of its Orbit or Concavity: For this Purpoſe convey a double-forked ſmall Hook within the Orbit, in ſuch a Manner, that with both the Hooks you may take Hold of the Optick Nerve near its Middle, which being thus extended by drawing the Hook towards you, if you have at hand a Knife, the Point whereof muſt be turned down like the *Greek* Letter Γ, you may eaſily cut it aſunder; but for Want of ſuch a Knife, you muſt make uſe of your Diſſecting-Knife, and with the Point thereof endeavour (after you have laid the Eye aſide toward the Noſe) to cut off the Optick Nerve, together with its circumjacent Muſcles; but if this will not ſucceed, you muſt remove the Eye from the Noſe backwards, and cut aſunder the Nerve on the oppoſite Side, till the Eye may be taken out without any further Difficulty.

The Eye being thus taken out of the Orbit, encloſed within the *Perioſteum*, you will find, upon a ſtrict View, that it repreſents in Shape a Pear; in which, beſides the Muſcles, Glands, and Fat, you muſt alſo take Notice as well of the Tunicks or Membranes as of its Humours. It has ſeveral Tunicks: The Firſt of all is the *Tunica Adnata*, which is to be ſeen immediately upon the Opening of the Eyelids; of which we have ſpoken before. This Tunic is to be removed with the Separation of the Fat: Then you muſt alſo ſeparate the greater Gland, placed in the exterior *Canthus* of the Eye, and keep it for your further Obſervation.

'Tis now Time to come to the Separation of the Muſcles, and to begin firſt of all with the Muſcle of the *Trochlæa*, which you may ſoon diſcover by handling the *Trochlæa*. Take Care to ſeparate this Muſcle to its very Extremity before you meddle with any of the reſt, for unleſs you do ſo, you will loſe it before you are aware of it. But after you have accompliſhed its Separation, proceed forward toward the Optick Nerve, and clear it of the Fat and Muſcles near the Globe of the Eye, and make a Ligature on it, ſo that you may remove it on what Side you pleaſe. Then clear the next Muſcle

that appears to your Sight of the Fat; afterwards the Second and Third, and ſo with the reſt, till they are all of them freed from their Fat.

There are no leſs than Six of theſe Muſcles, all which are implanted in the Membrane of the Eye, call'd the *Sclerotica*, but afterwards grow fleſhy, except the Muſcle *Trochleans*, which has an oblong Tendon, in which Muſcle you muſt not neglect to take Notice of the *cartilaginous Trochlæa*, which is peculiar to that Muſcle.

After the Muſcles are clear'd, you muſt remove the Fat, together with the *Annata*, from the Globe of the Eye, ſo that its fore Part be entirely freed from all that is foreign to it. Then cut off the Muſcles, the dilated Tendons whereof impart to the Eye the Membrane call'd the *Innominata*, which ſpreads it ſelf on the Outſide as far as to the *Cornea*. This Membrane is taken off together with the Tendons of the Muſcles.

Theſe Two Membranes or Tunics being removed, you muſt proceed alſo to the reſt. The Firſt you meet with is whitiſh, called the *Serotica*, from its Thickneſs. It encloſes the whole Globe of the Eye on the Outſide, till it degenerates toward the fore Part, where it becomes tranſparent, and then is called the *Cornea*. This Tunic muſt be taken off before you can have a free Acceſs to the interior Parts; and this may be done by Two ſeveral Ways, *viz.* either by making a circular Inciſion, or by decuſſating it thus, (X.) You muſt make a circular Section, if you intend to preſerve the *Cornea*; but make uſe of the other if you have no Regard to that Membrane.

Take hold of the Eye with Two Fingers of your Left Hand, ſo as to put one of them to the *Cornea*, and the other to the *Optick Nerve*, and then cut croſs the *Tunica Sclerotica*, in caſe you would preſerve the *Cornea*; but if you make no Account of that Membrane, put your Fingers to the Sides, ſo as to preſs the Eye gently together if it be flaccid, and then decuſſate the *Cornea* with your Diſſecting-Knife. After you have made theſe Inciſions, convey the Point of your Sciſſars very gently either within the *Sclerotica* of the relaxed Eye, for fear of wounding the *Uvea*, and cut it aſunder in a parallel Line with the *Cornea*; or elſe put your Sciſſars gently alſo betwixt the *Cornea* and the *Cryſtalline Humour*, and continue your Section on both Sides to the *Optick Nerve*. After having diſſected the *Sclerotica*, ſeparate it with a ſharp-pointed Knife from the Edge of the *Uvea*, wherewith it encloſes the Pupil of the Eye, with an eaſie Hand for fear of wounding the other Tunics, which would occaſion a Proflux of the Humours. The remaining Part of this Membrane is eaſily ſeparable from the *Uvea*. This Membrane owes its Riſe to the exterior Tunic of the Optick Nerve, which ariſes from the *Dura Mater*, as may be found out by ocular Demonſtration, if you continue your Section through the *Sclerotica* and the Tunic of the Nerve, for then you will find this laſt to be contiguous to the *Sclerotica*, near the Globe of the Eye, which you may ſeparate.

This Membrane being removed, the aqueous Humour falls in of courſe to be ſhewn, being ſeated before the cryſtalline Humour: but being of a fluid Nature, without any ſolid Conſiſtency, it is ſpilt immediately upon the Opening of the *Sclerotica* and the *Cornea*.

You muſt therefore return to the Tunics, or Membranes; the Firſt of which is on the fore Part, call'd the *Uvea*, and on the back Part the *Coroides*. This Membrane is not to be ſeparated like the preceding, but muſt be diſſected only lengthwiſe, and then the *Labia* of the Inciſion to be ſeparated artificially from the *Retina*, and to take Care that this thin and tender Tunic be not torn to Pieces. You muſt above all Things make an Inciſion in the Pupil of the Eye, becauſe it ſticks cloſer to its Sides than the reſt, and then make your Separation ſo, that the Humours, with their Tunics, may have a free Paſſage; for the Pupil being once removed, there is no Occaſion for any further Separation. This Membrane has alſo its Riſe from the Involucre of the Optick Nerve, but this muſt be underſtood of the interior One, which if you diſſect, you will ſoon diſcover the *Medulla*, and therefore you need not trouble your ſelf any further than to ſqueeze out this medullary Subſtance, ſo that this Involucre remains empty.

The

The Third Tunic is the *Retina*, or the *Amphileſtroides*, which ſome believe to owe its Riſe to the *Medulla*, unto which it reſembles by reaſon of its Softneſs. It is ſcarce to be ſeparated from the *Uvea*, and therefore moſt commonly they are both at once removed from the *Vitrea*.

There are ſtill behind the Membranes call'd the *Vitrea* and the *Cryſtallina*: The laſt of theſe Two comprehends and contains the *Cryſtalline*, and the firſt the vitreous Humours, ſo as to be inſeparable from their Humours: However, if you touch either of them with the leaſt Force with the Point of your Knife, they are ſoon diſcoverable, eſpecially the Cryſtalline, of which if you ſcrape off the leaſt Quantity, it produces an Inequality on the Surface of the Humour.

You muſt nevertheleſs endeavour to ſhew ſome Difference betwixt theſe Humours, which may be performed thus: Separate the Pupil of the Eye with much Caution from the Cryſtalline Humour, and then with no leſs Circumſpection cut aſunder with the Point of you little Knife the Fibrils betwixt the Cryſtalline and the Vitreous Membranes, and at laſt, by putting your Fingers underneath the Cryſtalline Humour, ſqueeze out the Vitreous Humour.

If you propoſe to have a full and exact View of all the Humours in their natural Poſition and Figures, you muſt pitch upon the Froſty Seaſon in the Winter-Time, when you muſt take the Eye out of the Orbit, and expoſing it to the cold Air, leave it thus till the Humours be congealed and frozen by the Cold. The Eye thus render'd hard and rigid by the Froſt, muſt be divided with your Knife into two equal Parts, and thus, among the reſt, you may have a View of the Aqueous Humour, which otherwiſe is loſt immediately upon the Diſſection of the Membrane *Sclerotis*.

CHAP. IX.

Of the Diſſection of the Ear.

THE Ear is the Organ of the Senſe of Hearing, and is diſtinguiſhed in the exterior and interior Part. In the external Part, (as far as relates to our preſent Purpoſe) you muſt take Notice of the Muſcles. I told you before, when I had Occaſion to ſpeak of the taking off of the Skin of the Head, that you muſt not meddle with the Muſcles of the Ears. Of theſe there are Two Pairs, one which draws the Ear upwards, and the other which draws it downwards again. The Firſt, being call'd the *Levator* or *Attollens*, is placed on the upper Part of the Ear, or the *Auricle*, upon the Temporal Muſcle, being very thin, and reſembling rather a carneous Membrane, which is eaſie to be ſeparated, together with the Skin. It is about the Breadth of an Inch, and of an oblong rotund Figure, the narroweſt Part being toward the Ear. Its Separation wants no further Explanation.

The Second Pair is the Muſcle call'd the *Retrahens*, of the ſame Subſtance and Bigneſs with the former. Sometimes there are more than Two of theſe Muſcles, but not always. It is ſeated upon the Bone behind the Ear, and is eaſily ſeparated from it, after you have taken off the Skin. If you are inclined to take a View of the external Part of the Ear, (or the *Auricle*) you may ſeparate the Skin which covers it, and then cut off the Cartilage from the Bone.

But in the internal Part, or the Ear properly ſo call'd, are many more Things worth your Obſervation; to bring which to your View, you muſt break the Skull, and ſeparate the *Os Temporum* and the *Os Petroſum* from the other Bones. Whilſt you are intent upon the Diſjunction of the Bones of the Skull, take Heed you do not proceed with too much Violence, for fear of hurting the internal Part of the Ear, ſo as to break either the *Tympanum*, or to put the ſmall *Auditory Bones* out of their Places. Then after having cleanſed the Ears of the Ear-wax, take a View of the *Tympanum*, and if you are very ſharp-ſighted, you will diſcover alſo the *Malleus* through the tranſparent Skin. Then take an Iron Pair of Tongs, and with them break that Part of the Bone which is placed toward the Forehead, ſo as to diſcover the Ingreſs of the *Meatus Auditorius* into the *Os Petroſum*. You muſt take off one Half of it, that thereby you may get a full View of the Bones in the *Concha*; but take Care not in the

leaſt to impair the *Os Lithodes*, becauſe here lie concealed the *Labyrinth* and the *Cochlea*. Here you will meet alſo with the Muſcle of the internal Part of the Ear, whoſe Function is to put in Motion the *Malleolus*.

Having removed the Bones, you muſt ſet your Saw to work upon the Bone *Lithodes*, it being very hard and ſtrong, and therefore not eaſily managed with the Knife alone, as *Riolan* would perſwade us it is. I could wiſh for an Opportunity at this Time to repreſent the Method of this Operation, rather by an ocular Demonſtration than by bare Words, it being a Matter ſubject to no ſmall Difficulty: But for Want of ſuch an Opportunity, will nevertheleſs endeavour to explain it as well as I can.

Therefore to render the Whole the more perſpicuous, I divide the whole *Os Lithodes* into Three Sides. In the Firſt is that Perforation through which paſſes the Optick Nerves. The Second next to this is that which in the *Cranium*, whilſt yet entire, is obvious to our Eyes. The Third is directly oppoſite to the Firſt, toward the *Concha*, and in it is the *Feneſtra Ovalis*.

Now you muſt make Uſe of a very fine thin Saw, wherewith to cut aſunder the bony *Lamina* which cover the Third Side. The Firſt Thing that diſcovers it ſelf is the *Ductus Cochleatus*, which is oppoſite to the Perforation intended for the Paſſage of the Auditory Nerve: However, it lies not directly oppoſite to it, the *Cochlea* being nearer to the *Os Temporale*. If you cut away ſomething more of the *Cochlea*, you will get Sight alſo of the Two *Meatus* of the *Labyrinth*, which are join'd in one Perforation above the *Cochlea*. If you have not opened the whole Duct of the *Cochlea* with your Saw, you may make a further Opening by the Help of a File, for it is not equal on all Sides. After you have laid open the *Cochlea*, you will meet at its Extremity with a Kind of a Concavity, where you will ſee a Concourſe of the Windings of the *Labyrinth*, as alſo the *Feneſtra Ovalis*.

Now it is Time you ſhould trace the anfractuous Ducts of the *Labyrinth*. Of theſe there are Three, which meet in one Place. When you begin this Diſſection, it would be very convenient for you to have before your Eyes one of the Bones diſſected, in order to regulate your Operation accordingly: But for Want of ſuch a one, I will in the mean while, as far as in me lies, endeavour to ſhew you the Place where to make your Beginning. In the Second Side is to be obſerved a ſlender Protuberancy not far from the *Os Temporum*: Under this lies concealed one of theſe Ducts, which muſt be ſuppoſed to be the Baſis of the Triangle; for ſuch is the Poſition of theſe Ducts, that on that Side where they face the *Os Temporalis*, they make an equilateral Triangle; and taken entire within themſelves, they make a Triqueter, the *Vertex* toward the *Cochlea*, and the Baſis near the *Os Temporum*. The Situation of the reſt you may diſcover by their Figures. If you are to ſeparate them, you muſt take away that which is betwixt the aforeſaid Duct and the *Os Temporum*: The exterior hard *Lamina* muſt be broken with a Hammer, and the remaining ſpongious Subſtance to be cut away with a Knife. Betwixt theſe Ducts alſo which lie incloſed betwixt a ſolid hard Bone, there is alſo a ſpongious Subſtance, which fills up the Spaces betwixt them: This muſt alſo be taken away by the Help of the Knife, ſo that each of theſe Circles may be obvious to the Eye: Theſe Circles you muſt alſo lay open. If the Bone be as yet freſh, and not dry, you may do it by abrading or ſhaving it with your Knife; but if it be very dry, you muſt make Uſe of a File. The Perforations, which will appear upon the Opening of the Bone by the File, you may make longer; nay, if you think fit, you may open them to the Place of their Conjunction; or if you do not approve of this Method, you may convey a Hog's Briſtle into and through each of theſe Ducts into the *Feneſtra Ovalis*.

In the Head of a *Fœtus* this Operation is not ſubject to ſo much Difficulty and Trouble, becauſe the Bones being as yet ſoft and tender, may be diſſected by the Help of a Knife only, without ſtanding in need of a Saw.

LIB. IV.

Of the LIMBS.

The INTRODUCTION.

HAving thought fit to prefix to this Book the Title only *of the Limbs*, I can't but advertiſe the Reader in its very Beginning, that my Intention is not only to explain thoſe Things that appertain to the Limbs, but alſo to add every Thing here, that has not been as yet treated of in the Diſſection of the Concavities of the Body; *viz.* the Muſcles of the Loins, Back, Neck, and Head; ſo that this Book might not improperly be ſtiled a Tract of the *Muſcles*, becauſe the greateſt Part, if not all of its Contents, relates to the Muſcles; and becauſe the *Muſcles* are to be the chief Subject to be treated of in this Book, I thought it not amiſs to add ſomething by Way of an Introductory Diſcourſe concerning the *Muſcles*, out of *Galen* and *Riolan*.

Riolan gives us the following Lines in his Preface to his *Myotomy* or *Diſſection of the Muſcles*: "He that has been well inſtructed "in the *Myology*, or Doctrine of the Muſcles, "will eaſily be brought to a true Under"ſtanding of this Part of *Anatomy*, which, "tho' judged by ſome to be entangled in no "ſmall Difficulties, he will be able to attain "to, by his own Induſtry, provided he fol"lows the Method I am going to preſcribe "here.

'Tis certain that the *Anatomy* of the *Muſcles* is not ſo very difficult to be performed, if you take Care to trace and follow the ſame Tract and Order as they are placed after one another in our Bodies. If therefore you will keep to this Path, I ſhall chaulk out to you in this Book, and beſides this conſult the Figures of *Veſlingius* and *Spigelius*, you need not fear the coming happily to your Journey's End. I muſt further give you this Advice, to cut away and throw aſide all the Muſcles immediately after their Separation, unleſs they be ſuch as you intend to preſerve for your Demonſtrations; for if you leave them hanging on the Body, they will be troubleſom, and obſtruct your Operation.

And becauſe the Diſſection of the Muſcles is among other Reaſons undertaken alſo for the better Diſcovery of the Actions belonging and being peculiar to each Muſcle; in what Manner you may beſt attain to this End, I will ſubjoin here in general Terms out of *Galen*.

'Be very attentive, (ſays he) how this is 'to be performed; for hereafter I ſhall ſpeak 'of all Manner of Diſſections, ſuch as lead 'us into the Conſideration of the particu'lar Motions of Animals. You muſt there'fore remove all the Fleſh from thoſe Bones 'you intend to take under your Examina'tion, leaving untouch'd only thoſe Muſ'cles which are the Inſtruments of their 'Motions. And, after you have made your 'Inciſion in theſe alſo, ſtrait to their Heads, 'you may then alſo cut them from the 'Bones where they have their Riſe, keeping 'them extended in the ſame Poſition as they 'were before; if you perform this Operation 'as you ought to do, you will plainly per'ceive the Motions of the Bones unto which 'the Muſcles are annex'd.

He backs theſe Words by giving us an Inſtance of it in the Muſcle call'd *Digaſtricus* of the under Jaw-Bone, when he ſays:

'If you make your Inciſion at its firſt 'Origin, and extend your Opening through 'its Body to the Chin, yet ſo as to preſerve 'that Part of the Muſcle where its Inſertion 'is into the under Jaw, and thus draw it 'back to its proper Origin, that will follow 'of Courſe, and the Bone be laid open. But 'all ſuch-like Operations muſt not be un'dertaken till the Skin be taken off, and 'whilſt not only the Ligaments of the 'Joints, but alſo the Muſcles, are ſoft and 'pliable, as they are in ſuch Carcaſſes as are 'diſſected ſoon after they dy'd. For the reſt, 'if you intend to enter into a ſtrict Exami'nation of the Functions of each Muſ'cle, you muſt take away every Thing that 'is foreign to it, and leave only thoſe that 'are placed cloſe to one another, whoſe Po'ſition and Motions you muſt make the Sub'ject of your frequent Conſiderations.

Let this ſuffice concerning the Enquiry of the Actions of the *Muſcles* in general. We will now return to the *Limbs*, of which there are two Sorts, *viz.* the *Hands* and the *Feet*; of each of which the great Creator has

has thought fit in his Wiſdom to beſtow a Pair upon Mankind. Nevertheleſs, to avoid needleſs Repetitions, I intend to confine my ſelf in this *Anatomical Tract* to the *Limbs* of one Side only, becauſe the Operation is very near the ſame in either of the two Sides of our Bodies.

CHAP. I.

How to ſeparate the Skin *and* Fat *in the* Hand *and on the* Back.

BEcauſe the *Hand* ſeems to challenge the Precedency among the Limbs, I will begin with that in this Book; but it muſt be cleared firſt of its Skin, before we can come to the Diſſection of its internal Parts.

I told you before in the Second Book, that in order to diſcover the Inſertion of the *Pectoral Muſcle*, you ſhould make an Inciſion in the Skin, up to the middle of the Shoulder. At the Extremity of this Inciſion, you muſt now make the Beginning of your Section, which muſt be continued all along the Middle of the Arm above the inward Flexure or Bending, where the *Median Vein* lies cloſe under the Skin, which you muſt take great Care not to cut off; then carry on your Section toward, and all along the Outſide, to the very Extremity of the Thumb. This done, you muſt ſeparate the Skin of the Arm, to the Hand, from the *Fat*; which, how it is to be performed, has been ſhewn already in another Place. At the very Point of the Elbow, or the *Olecranum*, there is a certain Membrane ſo cloſely join'd to the Skin, as to render the Operation very difficult in that Place. And becauſe there are a great many Veins creeping under the Skin, you muſt be very careful in your Diſſection, for Fear of wounding them; which if you avoid, you will have an exact View of the Diſtributions and Divarications of the ſubcutaneous Branches.

And becauſe there is no ſmall Variety in the Way of making your Diſſections in the Hand, I will treat of them in particular in a few Words. After you have, according to my preceding Direction, diſſected the outſide of the Thumb, make a parallel Inciſion alſo on its Inſide; and in the ſame Manner you muſt make a double Inciſion on each Finger, except on the little one; the inner Side whereof you need only open lengthways with your Knife. After having made theſe ſeveral Sections in the Skin, you muſt ſeparate it, firſt on the Inſide of the Fingers, and then on the Palm of the Hand: But here you muſt take Notice of a certain nervous Expanſion of a Muſcle interwoven with the Fat, and ſticking ſo cloſe to the Skin of the Palm of the Hand, as to be ſcarce ſeparated, unleſs it be by a dextrous and experienced Hand. This Separation you muſt begin at the Roots of the Finger, and ſo go on toward the Flexure of the Wriſt, always taking Care that the Tendon of the Muſcle be not wounded; as they uſed to do moſt commonly before *Galen*'s Time. But *Galen* did never ſeparate the Skin of the Hand, but took it off entire; and this was the firſt that found out this *Tendon*, which had been neglected before. In the Diſſection of the Fingers you muſt take Notice, that their Veins, Arteries, and Nerves, paſs along their Sides, and therefore muſt be carefully preſerved, whereas nothing like it is to be met with in the back Sides of the Fingers. After you have taken off the Skin on the Inſide, turn the Hand, and alſo fleeze it. You may begin with making an Inciſion round the Roots of the Nails, which done you may ſeparate the Nails from the Bones, by thruſting your Knife underneath them, and ſo take them off along with the Skin.

Thus much of the Skin, under which the Veins paſs along, being ſometimes ſo over-run with Fat, that they are ſcarce diſcernable, unleſs you clear them of it. Make your Beginning at the *Axillar Veins*, and free them from the Fat: From thence proceed toward the Extremities; but take Care you don't cut to Pieces the Branches ariſing from the *larger Veſſels*. Perhaps you will tell me, I ought to ſhew you how to avoid them; but you muſt know that this is not to be done, becauſe theſe Divarications of the Branches vary in every particular Body, and it muſt therefore be your own Buſineſs to take Heed, that every Thing be performed in this Point with the utmoſt Application and Exactneſs. You muſt ſeparate the Fat from the Veins thus:

Where you ſee the Channel of the Vein, make an Inciſion lengthways into the Fat, and then lifting up the Vein with a ſmall Hook, ſeparate the extended Fibres underneath it with the Point of your Knife till the Vein be cleared, and then take away the Fat: Or elſe you may make your Inciſion in the Fat, in a Place where it is free from any Veins, and then ſeparate it from the Muſcles. But in thoſe Places where you ſee the Tracts of any Veins, you muſt make an Inciſion lengthways in the interior Membrane of the Fat; and for the reſt, proceed as we told you before. The Veins which lie on the exterior Parts are the *Cephalick* and *Hepatick* Veins. And now you will meet with the ſame Difficulty in ſeparating the Fat in the Hand, as you did before with the Skin; becauſe the *Tendo Palmaris* is ſo deeply interwoven with the Fat in the Palm of the Hand, that one is not to be taken off without the other. But on the Back of the Hand there is no ſuch Thing as any *real Fat*, being only a viſcid and glutinous Subſtance, not deſerving the Name of Fat, which nevertheleſs rather increaſes than diminiſhes the Difficulty of the Operation. Add to this, that the Veins being here flaccid and empty, by Reaſon of the Recourſe of the Blood to the Heart, are not eaſy to be ſeparated from the Membranes; and therefore this Operation requires much Aſſiduity, Patience, and Labour. For the reſt, you muſt proceed in the ſame Manner as before.

The Skin being taken off of the Arm, you muſt turn the Body, and then likewiſe flea the Back, till you ſee the Points of the *Vertebres* of the Back appear, as alſo the Margin of the *Os Ilium*, and the *Glutæus Maximus*; or what is the ſame Thing in Effect, till you have cleared half the Back of the Skin, and ſo far you muſt afterward alſo take off the Fat.

CHAP II.

Of the Muſcles of the Shoulder-Blade.

THat broad Bone placed on the Back, for the Articulation of the Shoulder, is called the *Scapula* or *Omoplata*, or the *Shoulder-Blade*; the various Motions whereof are accompliſh'd by divers Muſcles, of which I reckon five in this Place; *viz.* the *Serratus minor Anticus*, the *Trapezius*, the *Rhomboides*, the *Levator*, and the *Serratus major*.

The *Serratus minor* lies under the *Pectoralis minor*, and appears as ſoon as that is taken away. It aſcends obliquely to the *Shoulder-Blade*, as may be ſeen by its Fibres. Diſſect its lowermoſt Side with a Diſſecting Knife, and then, after having cut it off of the Ribs at its Origin, ſeparate it from the Breaſt by Way of Excoriation. It adheres in its Progreſs to the *Deltoides*, under which it goes forward to the Proceſs *Carcoides*, where is its Inſertion, and muſt alſo be ſeparated thence.

Whilſt your Carcaſs is yet lying on the Back upon the Table, you muſt alſo ſeparate the *Serratus anterior* and the *major*, from the Shoulder-Blade and the *Subſcapular Muſcle*; then turn the Body, becauſe all the other Muſcles of the *Scapula* are placed on the Back.

The firſt among theſe, and which, after the Carcaſs is laid upon the Face, offers it ſelf to your View, after you have removed the Skin and Fat, is the *Muſculus Trapezius*, called alſo *Cucullaris* and *Scapularis*, being extended over all the other Muſcles of the Neck and Back. Its Origin is on the *Occiput* or hindermoſt Part of the Head, and the Vertebres of the Neck and Back, and is inſerted in the *Spine* of the *Scapula*, its Fibres being of a various Poſition. When you are to ſeparate this Muſcle, you muſt begin on its lower Part, oppoſite to the Loins, where you ſee the oblique Fibres aſcend towards the *Scapula*. Theſe you muſt diſſect, after having put back the Bone of the *Scapula* toward the Back, and then putting your Finger underneath it, ſeparate it till you come to the *Aponeuroſis* or Extremity by which it is joined to the *Spines*. This muſt be ſeparated with the Knife from the *Sacer Lumbus*, and the *Longiſſimus Dorſi*, and cut off of the *Spines* aſcending gradually to the Head, where you muſt, above the Muſcles of the Neck, turn back to the *Scapula*, and diſſect it from its *Proceſſus Spinoſus*, that hereafter it may not be in your Way.

The *Rhomboides*, or the *Quadratus*, is plac'd under this, having got its Name from its Four-Square Figure. It has its Riſe at the uppermoſt *Vertebres* of the Back, and the undermoſt of the Neck, and extending to the

…e ſuperior and exterior *Baſis* or lower Edge …f the *Scapula* obliquely downwards, has …s Inſertion there. You muſt ſeparate it, as …told you before, by clearing it with the …elp of your Hands of the ſubjacent Parts, …eginning at the Side; but becauſe in its …ourſe it is cloſely united to the Tendon of …he *Serratus Poſticus ſuperior*, you muſt alſo …ake uſe of your Knife, and then diſſect it …t its Origin and End.

The Fourth Muſcle of the *Scapula* is the *Levator*, called by ſome the *Muſcle of Patience*, becauſe when People make a Sign of Patience or Compaſſion, by the Shrugging up of their Shoulders, it is performed by the Help of this Muſcle. Its Origin lies concealed betwixt the Muſcles of the Neck, and therefore you muſt, in order to diſcover its Riſe, ſeparate from its foremoſt Part the *Maſtoideus* and *Scalenus*, being ſeated on the tranſverſe Proceſſes of the upper *Vertebres* of the Neck. Thence you muſt ſeparate it with your Knife, and trace it to its Inſertion, *viz.* to the upper Angle of the Bone of the *Scapula*.

The Inſide of the Muſcle called the *Serratus major*, is contiguous to the whole *Baſis* or lower Edge of the *Scapula*. It is ſo called, becauſe it is agglutinated by its teeth-like or dentiform Proceſſes to the Ribs, as well properly ſo called as to the Baſtard *Ribs*. It is joined to all the Ribs, becauſe I have obſerved its Progreſs even to the firſt Rib, but only to ſome of the *Spurious Ribs*. To the fore Part it muſt be ſeparated from the *Subſcapular* Muſcle, of which hereafter, and in the hindermoſt Part from the Ribs; all which may be done by Way of Excoriation, except that at its Origin and End you muſt diſſect it with your Diſſecting Knife.

CHAP. III.

Of the Muſcles of the Shoulders.

WHen I ſpeak of the Muſcles of the Shoulder, I mean thoſe Muſcles that are intended for its Motion; of which there are no leſs than Nine, according to the common Computation; *viz.* the *Pectoralis*, *Deltoides*, the *Perforatus*, the *Latiſſimus Dorſi*, the *Rotundus major*, the *Rotundus minor*, the *Infraſpinatus*, the *Supraſpinatus*, and the *Subſcapularis*.

Having ſpoken of the Anatomy of the *Pectoral Muſcle* (which lies upon and covers the greateſt Part of the Breaſt, or the fore Part of the *Thorax*) before, when we treated of the Breaſt, we will refer the Reader to that Head in this Reſpect.

However, after having taken off the *Pectoralis* and the *Serratus minor*, you muſt take Notice under the Armpits, near the Shoulders, of three Different Veſſels, which paſs that Way from the *Thorax*, or middle *Venter* or *Region*, through the *Muſculus Scalenus*. From the uppermoſt Nerve (for here is a Conjunction of no leſs than Five thick Nerves) there proceeds an immediate Branch, which reflecting backwards, diſperſes its Branches through the Muſcles of the *Scapula*. In the ſame Place you ſee the Riſe of the *Cephalick* and *Hepatick Veins*, the firſt whereof paſſing betwixt the *Deltoides* and the *Pectoralis*, makes its Appearance at the Extremities of theſe Muſcles, and continuing its Courſe under the Skin, along the exterior Side of the *Biceps*, where it is accompanied by a Nerve, at the Flexure of the Elbow proceeds deeper inward. The *Hepatica* taking its Courſe thro' the Inſide of the Arm, makes up the *Median Vein*, and then deſcends to the Hand. But we muſt return to the Muſcles.

That large and broad Muſcle which is placed upon the *Axilla*, or Armpit, is called the *Deltoides*, plainly to be perceived in living Bodies. It has its Riſe from the *Spine* of the *Scapula*, the *Acromium*, and the *Clavicle*, and proceeds to the middle of the Arm, to the ſame Place with the *Pectoralis*. Firſt, you muſt ſeparate the *Cephalick Vein*, and after that lift up the Shoulder, and diſſect the *Deltoides* in the Side. You may begin your Section where it is neareſt to the Back, becauſe there its Connexion is not very firm, but eaſy to be ſeparated. It aſcends above the *Infraſpinatus* to the *Spine* of the *Scapula*, unto which you muſt keep cloſe in your Section, carrying it obliquely upwards, and when you come to the *Spine*, there cut it off. Then ſepatate it alſo by another Section from the *Acromium* and the *Clavicula*, and after that, turning it toward the Shoulder alſo from

from the *Os Humeri* or Shoulder-Bone. Its Inſertion is where it is moſt cloſely coherent to the Bone.

The *Perforatus* is a very ſmall Muſcle, but has this peculiar to it ſelf, that a Nerve paſſes quite through it, whence it has got its Name of being *perforated*. *Veſlingius* has given it no Name, but *Riolan* calls it the *Coracoideus* and *Coracobrachiæus*, from its Origin and Inſertion. It grows to the *Scapula*, in the ſame Place with one of the Heads of the *Biceps*, unto which it is alſo contiguous and intermix'd in ſome Meaſure. You muſt begin its Separation near its Inſertion, where you muſt clear it of the *Biceps*. You muſt alſo here take Notice of the Nerve, which being ſeparated from that Conjugation of Nerves that take their Courſe to the Arm, makes a Perforation through the Inſide of this Muſcle, and continues its Courſe under the *Biceps* to the Elbow and the Extremity of the Hand.

On the very Inſide of this Muſcle is a large Nerve, with ſome Veins and Arteries. About the Middle of the *Perforatus*, one of the Branches leaving its Trunk, and under the *Extenſor Cubiti Biceps* paſſing along with the *Brachiæus*, diſperſes it ſelf through the Muſcles ſeated at the hindermoſt Part of the Elbow, yet ſo, that Part thereof goes forward near the *Supinator Longus* to the Hand, paſſes through the *Radius*, and ſpreads its Branches to the Outſide of the *Index* and middle Finger. Near the End of this Muſcle the Nerve divides it ſelf into Two Parts, one whereof is carried backwards to the Elbow, and thence to the Extremity of the Little Finger; whence it is, that if a Blow is given on the *Olicranum*, it produces a Benummedneſs in the Little Finger; the other taking its Courſe in the fore Part, betwixt the *Profundus* and *Sublimis*, goes into the Hand under the Thumb, and thence to the Extremities of the *Index* and Middle Finger.

Tis now Time you ſhould turn your dead Carcaſs, becauſe all theſe beforeſaid Muſcles are placed on the fore Part of the Body.

The Muſcle call'd the *Latiſſimus Dorſi*, otherwiſe the *Antiſcalptor*, has its Riſe from the Spine of the *Vertebra*, and grows to the Spine of the *Os Ilium*. I told you before, in the Anatomy of the Muſcles of the *Abdomen*, or inferior *Venter*, that it muſt be taken away for the Sake of theſe Muſcles: Therefore begin your Diſſection here, and continuing to carry it to the upper Parts, ſeparate the Muſcle either with your Finger or with a Diſſecting-Knife made of Ivory, that ſo you may the eaſier break the Fibres: Then turning downwards to its Origin, diſſect it from the Spine of the *Os Ilium*, and ſeparate it with Circumſpection from the inferior *Serratus Poſticus*, becauſe here their nervous Origins are not only cloſely join'd, but alſo in ſome Meaſure intermix'd with one another; therefore you muſt proceed with Caution, ſo as to preſerve the *Serratus Major* in its Poſition, and to take away this. Whilſt you are ſeparating this Muſcle, you will meet with a ſlender Portion of a carneous Subſtance, which ariſing from the inferior Angle of the *Scapula*, is annexed to it. This, if it be not a peculiar Muſcle, not taken Notice of by the Anatomiſts hitherto, muſt be a Part of this Muſcle, unto which it is contiguous, and implanted together with it in the Shoulder. You muſt divide this Part from the *Scapula*, and take it away together with the Muſcle.

In caſe the *Os Claviculæ* be ſeparated, you may now take off the Arm of the Body, in order to manage it the better hereafter at your Pleaſure.

The Muſcle call'd *Rotundus Major* being adjacent to the before-mentioned carneous Portion, has its Riſe at the under Part on the Side of the *Scapula*. Near unto this is the *Rotundus Minor*, or the *Tranſverſus Brevior*, having its Origin on the ſame Side of the *Scapula*, or *Omoplata*, but ſomewhat nearer to the Arm. You may beſt diſtinguiſh theſe Two Muſcles, if you begin your Diſſection at the Inſertion, where they are very diſcernable, becauſe the Firſt has its Inſertion near the Middle of the Shoulder, and the other at the Head of it. After you have ſeparated them, cut off the *Major* of the lowermoſt Rib of the *Scapula*, and the *Minor* of the *Infraſpinatus*, and at the ſame Time make your Diſſection at its Origin.

Next unto this is the *Infraſpinatus*, call'd alſo the *Superſcapularis Inferior & Secundus*. It lies hidden in that Concavity of the *Scapula* which is made by the *Spine* and the Back-

ckſide of the *Scapula* on its under Part; elſe you may ſay, that it has its Inſertion the *Interſcapulium Inferius*, on the Head of e Shoulder. The whole Operation is perrmed by looſening it by Abraſion from e Bone, ſo as to begin at its Extremity.

The Muſcle call'd *Supraſpinatus* is alſo ſtiled *Superſcapularis Superior & Primus.* This Muſcle is placed in the upper and oppoſite Cavity, on the Outſide of the *Scapula*, or in the *Interſcapulium Superius*, and proceeds under the *Acromium* to the Top of the Shoulder. You muſt diſſect the Ligaments betwixt the Two Proceſſes of the *Scapula*, and then ſeparate by Way of Abraſion the Muſcle from the Bone, beginning at the *Spine* of the *Scapula.*

The Muſcle call'd *Subſcapularis*, or *Infraſcapularis*, and *Immerſus*, is ſeated in the interior Part of the *Scapula*, and there fills up its concave Part. Its Origin is at the Baſis of the *Scapula*, and its End at the Top of the Shoulder. You muſt firſt ſeparate it from the Rib of the *Scapula*, and then from the Bone.

CHAP. IV.

Of the Muſcles that move the Arm.

FIVE Muſcles belong to the *Cubitus*, or Elbow. which are ſubſervient to its Twofold Motion, *viz.* to its Extenſion, and Flexior or Bending. The Two *Flexores* are placed on the fore Part, and the *Extenſores* on the hindermoſt. Concerning the *Flexors*, it is to be obſerved, that their Connexion with the Bone of the *Cubitus* is ſcarce or perhaps not at all to be diſcovered, till you have removed certain Muſcles belonging to the Hand; of which, more in the following Chapter; Therefore you muſt not be too haſty in cutting off theſe Muſcles, but delay the Diſſection of them at their Origin till you have done with the Section of the Muſcles of the Hand.

The Firſt of theſe Muſcles that bend the Arm is call'd *Biceps*, from its double Head or Beginning: One of theſe has its Riſe at the *Proceſſus Coracoides*; the other on the lower Part of the Neck of the *Scapula.* It runs ſtreight downward, and ends at the *Radius*, having a very ſtrong Tendon, which is the Reaſon that if we draw the Elbow together on a ſudden, we find a certain Stifneſs near the Flexure. The *Median Vein* paſſes through this Muſcle. The Separation of which is not very difficult, if you lay hold with your Hand on both the Heads or Beginnings, and draw it downwards, and ſo ſeparate it by Way of Excoriation. You muſt alſo pull aſunder both its carneous Parts, or elſe ſeparate them with your Knife; for near its Origin each of them is diſtinguiſh'd by, and encloſed in a peculiar Membrane.

The Second Muſcle that bends the Arm is called *Brachiæus: Riolan* has given it the Surname of *Internus.* Its Origin is at the Middle of the Shoulder, from whence it proceeds forward under the firſt Muſcle, and extends it ſelf along the Bone of the Arm, whence it has got its Name. It ends in the anterior or leſſer *Epiphyſis* of the *Cubitus*, and hides it ſelf betwixt the Muſcles of the *Radius*, being contiguous to the *Supinator longus*, and therefore theſe Muſcles muſt be ſeparated firſt, before you can come at this with your Diſſecting Knife, which when you have made uſe of, ſeparate it by Abraſion from the Bone of the Shoulder. I muſt not forget to tell you, that the Veins and Arteries which take their Courſe to the inner Part of the Hand, but eſpecially to the *Carpus* or Wriſt, do paſs over this Muſcle.

There are Three *Extenſores*, in which I agree with *Veſlingius.*

The firſt is called the *Extenſor Longus*, which might alſo not improperly be called *Biceps Poſticus*, becauſe it has a double Head or Beginning, one at the undermoſt Rib of the *Scapula*, near the Neck, the other in the Shoulder; both which, after this Conjunction, end in the *Olecranum. Riolan* makes them two diſtinct Muſcles; unto which he gives the Name of the *Long Extenſor* and the *Short Extenſor.* He calls that the *Long One* which has its Riſe on the *Scapula*, and the other which comes from the Shoulder the *Short.* This Muſcle contains a certain Nerve which deſcends to the Wriſt, of which we have ſpoken before. This Muſcle is eaſy to be ſeparated at its Origin; but very hard at its End, where it cloſely adheres, nay is even in ſome Meaſure intermix'd with the *Short*

Ex-

Extenſor. For it is to be obſerved, that the *Long* and the *Short Extenſores* become one and the ſame Muſcle at the *End* before they come to the *Olecranum*; juſt as thoſe that are ſubſervient to the Extenſion of the Foot, the *Vaſtus*, the *Crureus*, and the *Rectus*, being intermix'd with one another at their Extremities, make up but one Tendon, which encloſing the *Nerve*, terminates in the fore Part of the *Tibia*.

Next comes the *Extenſor Brevis*, being adjacent to the former. *Riolan* calls it the *Brachiæus Externus*. It has its Origin on the back Side, about the Middle of the Shoulder, and is all along coherent to it. It muſt be in ſome Meaſure diſtinguiſh'd from the former, and ſeparated from the Bone.

The *Anconeus* is a very ſmall Muſcle, not much longer than a Man's Thumb. It is placed on the out Side of the *Olecranum*, above the Joint. You may ſee it thro' that tranſparent nervous Membrane which lies over it, it being diſcernable from the reſt by its appearing like a white Streak. Make an Inciſion above this white Streak, which goes obliquely to the Cubit. You muſt ſeparate this Muſcle from the other adjacent Muſcles, as alſo from the inferior *Epiphyſis* or *Appendix* of the Shoulder Bone; and laſtly alſo from the *Olecranum*, and the Cubit.

Here perhaps I ought alſo to have treated of the Muſcles of the *Radius*, together with the Muſcles of the Cubit; but theſe being placed very deep betwixt the Muſcles of the Cubit, I thought fit to reſerve their Anatomy for the next following Chapter.

CHAP. V.

Of the Muſcles placed upon the Radius *and the* Cubitus.

HEre I muſt give a Caution to my Reader, that I don't intend to confine my ſelf to the ſame Order and Method which is moſt commonly obſerved by other Anatomiſts, *viz.* ſo as firſt to take into Conſideration the *Flexors* and *Extenders* of the *Carpus*, and then the *Flexors* and *Extenders* of the Fingers; it being my Intention to treat of the Muſcles in the ſame Order as they are placed by Nature it ſelf: *viz.* We muſt begin at ſome certain Points, and from thence run thro' the adjacent Muſcles, till we return to that very Place from whence we ſet out at firſt. For the *Cubit* and *Radius* are ſurrounded and encloſed with Muſcles, which muſt be ſeparated in the ſame Order as I ſhall direct you, making your Beginning at the outſide of the Cubit.

I muſt give you this further Admonition concerning theſe Muſcles that have very long Tendons, that you muſt begin their Separation at the Tendon, this being much the eaſier Way, and much leſs troubleſom, than any other. *Galen* is of the ſame Opinion, who, ſpeaking of the *Flexors* of the *Carpus*, has theſe Words:

'In thoſe that are ſubſervient to the bending of the *Brachiale*, you muſt begin your 'Diſſection above the *Flexure* of the Joint; 'for here they viſibly terminate in certain 'nervous thin Bodies, and diſcover the circumſcrib'd Extremities of their Tendons 'ariſing from thence. Then you may ſepa'rate them both from what Portions or 'Particles lie underneath or about them, 'even to their inferior and ſuperior Extre'mities, as has been ſhewn already.

Riolan is of a contrary Opinion in this Point, and is poſitive, that we ought not to begin the Diſſection of theſe Muſcles at the Tendons, for fear, doubtleſs, of dividing theſe Muſcles where they ſhould not be divided. But there is no Occaſion for ſo much Precaution, this Danger being eaſily avoided, after the Operator is forewarned of it.

The firſt Muſcle where I uſed to begin my Diſſection is call'd the *Cubitus Externus*, as alſo the Second *Extenſor* of the *Carpus*. This you will find at the Bone of the Cubit, becauſe it adheres cloſe to it on its hindermoſt Part. Its Origin is not far from the *Anconeus*, the Separation whereof we have ſhewn you in the preceding Chapter; and is eaſily diſtinguiſh'd from this, which has its Inſertion in the *Carpus* under the little Finger. You muſt ſeparate it, as I told you before, by clearing the *Tendon* of the ſubjacent Parts; but eſpecially of the Membrane, which ſpreads over moſt of the Tendons, and likewiſe involves the Muſcles. This Membrane you muſt diſſect lengthways, in that very Place where you ſee the white Streak

Streak betwixt this Muſcle and the *Extenſor* of the Fingers, and thus ſeparate the *Cubitus* both from the Cubit and the adjacent Muſcle.

Before you go further, you muſt make an Inciſion into that circular membranous and nervous Ligament which keeps the Tendons of the Fingers in their proper Poſitions: It is called the *Armilla* or Bracelet, and the *Ligamentum annulare*, and is ſufficiently conſpicuous on the Back of the Hand by its oblique tranſverſe Fibres. After its Diſſection turn it aſide, that ſo you may have a free Acceſs to the Tendons.

Now you muſt clear the Tendons, which you ſee aſcending from the Back of the Hand toward the Fingers, from thoſe Membranes wherewith they are inveſted. Then you muſt put your Style under the four large ones, and lift them up, that ſo you may have an Opportunity of cutting aſunder the Fibrils by which they are joined together. Going backwards toward the Cubit, you will diſcover the Difference betwixt the *Extenſor*, as well of the little Finger, and of the *Index* or fore Finger, as betwixt that of the *Carpus*. After you have ſeparated it as far as to its Origin, which is in the *Condylus Exterior*, or outward Protuberancy of the Shoulder, cut it off, and trace its Tendons to the *Phalanges* of the Fingers; for here you will find them to ſtick cloſe to the outſide.

In the ſame Manner you muſt ſeparate the *Indicator*, which imparts its Tendon not only to the fore Finger, but alſo to the middle Finger.

Neither does the *Extenſor* of the little Finger require any other Method, which ſends forth its Tendons alſo to the next Finger, or the *Annularis*.

Theſe two Muſcles joined together, are correſpondent to the *Flexor Profundus*, as the former is to the *Flexor Sublimis*, and therefore might not improperly be called the *Extenſor Sublimis & Profundus*.

Now follow in Order the two *Extenſors* of the *Thumb*, having one and the ſame Beginning near the Middle of the Cubit, and jointly purſuing their Courſe thro' the *Radius*, are not ſeparated before they come near to the Thumb, where one of them is with one ſingle Tendon inſerted into the Third Joint; and the other, with a double Tendon, into the firſt and Second Joint. Its Separation is to be undertaken in the ſame Manner as has been told before in general.

Now you may ſee the Muſcle called the *Radius Externus*, or the firſt *Extenſor* of the *Carpus*, laid open on one Side. It is adjacent to the exterior *Radius*, whence it has got its Name. Its Origin is on the Protuberancy of the Bone of the Shoulder, and about the middle of the *Radius*. It is divided into two *Tendons* (whence it is alſo called *Bicornis*) incloſed in a membranous Involucre, and are join'd to the *Carpus* and *Metacarpus*. *Galenus* is of Opinion, that they are Two diſtinct Muſcles; and not without ſome Reaſon, for it moves different Parts, and may be diſtinguiſhed within it ſelf, if you will take true Pains to find it out. To do this, make an Inciſion with your Diſſecting Knife in the Involucre, or membranous Scabbard, and directing your Diſſection upwards, divide theſe Muſcles, and you will be convinced that they are diſtinct from one another. *Riolan* himſelf has confeſs'd this in his *Enchiridion*. Betwixt this and the next following Muſcle, a Nerve aſcends on the Inſide to the Thumb and fore Finger; and ſo does a Vein, and that *Artery* wherein Phyſicians commonly feel the Pulſe in the *Carpus* or Wriſt.

Next you muſt proceed to the Muſcle called the *Supinator Longus*, which taking its Riſe on the Shoulder, above the exterior *Apophyſis*, is inſerted below in the *Radius*. Under this lies the Muſcle called the *Supinator Brevis*, which taking its Origin near the ſame Place, and paſſing over the *Radius*, has its Inſertion in its Inſide, or fore Part, above the middle. You muſt ſeparate the *Longus* from the *Brevis* by the Help of your Inciſion Knife, beginning at the Sides, and continuing your Separation both upward and downwards. After you have removed this Muſcle, you will ſoon get Sight of the *Second Supinator*, which ſurrounds the Bone of the *Radius*. It is altogether *Carneous*, both at its Origin and End. If you intend to ſeparate it, bend the Hand backwards, and looſen it, by Way of *Abraſion*, on the Sides from the Bone of the *Radius*, and then cut it off at its Origin and End. But there is no great Occaſion for its Separation, becauſe

You may ſeparate all the reſt of the Muſcles, tho' this is left in its Poſition.

The next of Courſe is the Muſcle called the *Proxator Radii Longus*, whoſe Action is quite contrary to thoſe of the preceding Muſcles. Its Origine is on the Inſide, in the interior *Condylus*, and afterward deſcends obliquely downward to the *Radius*, and has its Inſertion on the back Side. Its Separation is the ſame with that of the other Muſcles that have long Tendons.

Not far from this Muſcle is placed another called *Carpi Flexor*, or *Radius Internus*, as *Riolan* will have it. Its Poſition is oppoſite to that of the *Radius Externus*. It ariſes from the Shoulder, near the before-mentioned Muſcle, and paſſing above the *Radius*, goes forward to the Thumb, and has its Inſertion in the Bone of the *Metacarpus* in the firſt and fourth Joint. Its Separation is the ſame as has been often ſaid before.

The Muſcle called the *Palmaris* ariſes in the ſame Place. Near its Origin it is carneous, and of the Shape of a ſmall Pyramid; but ſoon after degenerates into a long and narow Tendon, which deſcending directly over the *Sublimis*, is join'd in its Paſſage to the Bone of the *Carpus*, which lies under the Thumb, after which it is joined by its nervous Fibres to the firſt *Condyli* or Roots of the Fingers. Make your Inciſion in the Membrane which incloſes the Muſcles above the Tendon, and free the carneous Part of the Muſcle from the contiguous Parts. Then ſeparate it from the Bone of the *Carpus*, and afterward, lifting up the broad Tendon, ſeparate it from the interior Tendons of the Hand.

After you have cut off this Muſcle, you will diſcover a Nerve entring the Palm of the Hand under the Thumb, and diſperſing its Branches, *viz.* two to the fore and middle Finger, and one to the *Annularis*. Under the *Abductor* of the little Finger is another Nerve, which imparts two of its Branches to the *Auricularis*, and one to the *Annularis*. If you have a Mind to ſeparate them, follow their Tract, and with a keen Diſſecting Knife, diſſect the *Tunic* which encloſes them, and then ſeparate them with a gentle Hand. They creep along on the Sides of the Fingers to the very Extremities.

The Muſcle called *Sublimis* by *Riolan*, and *Perforatus* by others, is both in its Origin and Progreſs placed under the *Palmaris*, intended for the Flexure of the Second Joint of the Fingers. Near its Origin it ſeems to be no more than one Muſcle; but ſoon after divides it ſelf into four Parts, and produces as many long Tendons, which, becauſe they are of a conſiderable Length, ſtood in Need of ſome Fence, leſt, if they had been left alone, they might have proved unſteady in their Motions. Nature has thought fit to prevent this Inconveniency by a double Ligament; for in the *Carpus* they are kept ſteadfaſt by the *Armilla*, or annular Ligament, and in the Fingers they are kept within their due Bounds by another circular Ligament; beſides which, they are join'd together by certain Membranes.

Thoſe Muſcles that move the Third Joint, are in all Reſpects like the former: With this Difference only, that theſe Muſcles are not *perforated*, but *perforate*; for which Reaſon they are called *Perforates*. *Riolan* calls them the *Profundi*, becauſe they lie hidden under the former. The Separation of theſe Muſcles being altogether the ſame with the former, I will treat of it at once.

Make an Inciſion with your Diſſecting Knife in the middle of that Ligament, which ariſing on the Sides of the Fingers ſurrounds the Tendons; but take Heed not to cut aſunder the Tendons. This done, cut alſo aſunder the *Armilla*, underneath which theſe tendinous Twigs take their Courſe to the Fingers. Then put your Style underneath the Tendons, and lift them up all together, and let your Attendant hold them up whilſt you ſeparate the Tendons, by cutting aſunder the Membranes. They are divided at firſt only into Four; but afterward, each of theſe Four has ſtill a double Tendon extended one upon the other, which you muſt tear aſunder. You will eaſily diſtinguiſh the Interſtice by your Eyes; and then you muſt cut aſunder with the Point of your Knife the Membrane that joins them together. This done, lift up with your Style a little the Tendons only of the *Perforatus*, and ſeparate the Muſcle toward its Origin, where you muſt cut it off. Then you muſt alſo ſeparate the other Muſcle, *viz.* the *Perforans*, from that Ligament by which it is

join'd

join'd to the Bones of the *Cubitus* and of the *Radius*; but take Heed you don't cut the Ligament in this Operation.

The *Tendons* of this *Muſculus Profundus* give Birth to ſome other Muſcles in the Palm of the Hand, called the *Lumbricales*, which bend the firſt Joint of the Fingers. *Riolan* ſays, they ariſe out of the annular Ligament; but I could never as yet obſerve them to be coherent to it: But be that as it will, (for 'tis not a proper Place to diſpute that Matter here) 'tis certain that they ſtick cloſe to the Tendons of the *Profundus*, whence they muſt be ſeparated, as likewiſe from the *Muſculi Interoſſei*, where you muſt look for their End, which you will find near the firſt Joint.

The Muſcle called the *Flexor* of the Thumb has its Riſe on the Inſide, about the Middle of the *Cubitus*, and ſtretches to the Thumb under the *Thenar* or *Abductor* of the Thumb, being deſign'd for the Motion of its firſt Joint. Sometimes it is inſerted alſo into the Second. Its Separation is the ſame as before.

From the interior *Condylus*, or internal Protuberancy of the Shoulder, ariſes laſtly the *Second Flexor* of the *Carpus*, called the *Cubitus Internus* by *Riolan*. It paſſes above the Cubit directly to the *Brachiale*, where its Inſertion is under the little Finger.

After you have removed all theſe beforementioned Muſcles, you will laſt of all get Sight alſo of the Muſcle called the Second *Pronator Quadratus Radii*, which being placed at the Root of the Hand, is joined as well to the Bone of the *Cubitus* as to that of the *Radius*, owing its Riſe to the firſt, and its End to the laſt.

I ſee no great Occaſion for its Separation, becauſe no other Muſcles lie under it.

CHAP. VI.

Of the Muſcles properly belonging to the Hand.

THere are certain Muſcles belonging to the Hand properly ſo called, the Anatomy whereof is to be the Subject of this Chapter.

The firſt is called the *Abductor* of the little Finger, being placed under the little Finger. Its Riſe is on the *Brachiale*, but more eſpecially on thoſe two Bones, one of which lies near to the little Finger, the other under the little and the annular Finger. Its Inſertion is in the firſt *Internodium*. In its Separation you muſt begin on the Back of the Hand, and firſt looſen it from the Bone of the *Metacarpus*; after which diſſect its Origin, and laſt of all, if you think fit, its End alſo.

The Second is the *Abductor* of the Thumb, called *Thenar* by *Riolan*, ſeated at the Side of the Thumb. It ariſes on that Bone of the *Brachiale* which lies under the Thumb, and has its Inſertion in the Second Joint of the Thumb. Its Separation is the ſame with the preceding Muſcle.

The Third is the *Abductor* of the Thumb, otherwiſe called the *Antithenar*, which draws the Thumb toward the fore Finger, being placed on the Back of the Hand. It extends croſsways from the Fourth Bone of the *Poſt Brachiale* to the firſt Joint of the Thumb. Bring the Thumb gently to the fore Finger, and then ſeparate with your Knife this Muſcle from the ſaid *Abductor*, (which are eaſily diſtinguiſhed by the different Poſition of their Fibres) and then gradually cut off its Origin from the Bone of the *Metacarpus*.

There is beſides this another *Abductor* of the *Thumb*, being that Muſcle which moves it toward the other Fingers. *Riolan* calls it the *Hypothenar* of the Thumb. It is placed in the Palm of the Hand, and has its Riſe on the Second Bone of the *Poſt Brachiale*. Its Separation is the ſame with the next preceding Muſcle; which done, you muſt cut off the Thumb, without which you will ſcarce be able to ſeparate the *Abductor* of the fore Finger.

Upon the cutting off of the Thumb, the Origin of the *Abductor* of the fore Finger is cut off at the ſame Time; ſo that you need only ſeparate this Muſcle with your Knife from the Bone of the *Metacarpus*.

There remains nothing here now, but the Muſcles called the *Interoſſei*; of which there are no leſs than Six in the Hand, *viz.* Three interior, and as many exterior Ones. They

can't be ſeparated, unleſs you divide beforehand the *Brachiale* and *Poſt-Brachiale*; wherefore you muſt ſeparate theſe two with your Knife, and then diſſect the Ligaments which unite the Bones of the *Metacarpus* both above and below; ſo that you may part theſe Bones a little from one another; which done, you will without any further Direction ſoon be able to diſcover the Difference, as well of the *Interior* as of the *Exterior Interoſſeous* Muſcles.

CHAP. VII.

Of the Muſcles that move or bend the Head.

BEcauſe the Head is apt naturally (by its own Weight) to incline forward, it is furniſhed with one Pair of Muſcles only, which move or bend it forward; but to keep it upright, has got many other Muſcles placed for that Purpoſe on the Neck. That Pair which is ſeated in the foremoſt Part is called the *Parmaſtoideum*, which immediately, upon the Separation of the muſculous Expanſion, appears plainly to your Eyes. Its Origin is cut away at the ſame Time when you remove the *Sternum*, which you muſt take hold of, and ſeparate it from the ſubjacent Muſcles; but more eſpecially from the *Scalenus*; from whence you muſt proceed to the End, which you will find in the *Proceſſus Maſtoides*.

In the Neck you will meet with ſix Pair of Muſcles, which are commonly ſaid to belong to the Head; *viz.* the *Splenius*, the *Complexus*, two *ſtrait* Ones, and as many *tranſverſe* Ones.

After you have removed the *Trapezius* and the *Rhomboides*, you will ſoon get Sight of the Muſcles called the *Splenii*, which ſurround the back Part of the Neck. Their Origin is at the *Spinous Apophyſes* of the *Vertebres*, as well of the Neck as of the Back, and their End at the *Occiput*. You muſt begin its Separation on that Side which is next to the Armpits, deſcending toward its Origin, which you muſt cut of, and then ſeparate it to the Place of its Inſertion. But take Care you don't at the ſame Time ſeparate alſo the next following Muſcle.

For the Muſcle called the *Complexus* lies juſt under it; having got its Name, becauſe it contains and comprehends as it were both the *ſtrait* and *tranſverſe* Muſcles. It has its Origin in the ſame Place with the preceding, neither is there any Difference in the Inſertion; and conſequently the Separation is alſo the ſame.

No ſooner have you removed this Muſcle, but you will ſee ſeveral more appear at once; *viz.* the *Recti* or ſtrait Ones, two on each Side, and as many of the tranſverſe Muſcles. Hence it is that *Galen* had ſufficient Reaſon to wonder, how *Lycus* could take Notice only of the ſtrait Muſcles, without perceiving the reſt. The *Recti* are divided into the greater and leſſer, and the *Oblique* Muſcles in the *ſuperior* and *inferior* Ones.

The *larger ſtrait* Muſcles have their Riſe on the double Spine of the Second Vertebre of the Neck, and being carried obliquely to the *Occiput*, in a Manner cover the *leſſer ſtrait* Muſcles.

The leſſer ſtrait Ones are placed cloſe to them under the *Occiput*, differing from them only in their Origin; for theſe have their Riſe on the firſt *Vertebre* of the Neck. If you intend to ſeparate the *larger* and *leſſer ſtrait* Muſcles, put your Thumb of the Left Hand upon one of them, and your fore Finger upon the other, and thus thruſt them a little aſunder; by which Means you may with the Point of your Diſſecting Knife cut aſunder the extended Fibres, and then cut off the *larger ſtrait* Muſcle, either at its Origin or End.

The *Oblique*, *ſuperior*, or *leſſer* Muſcles, ariſe out of the tranſverſe Proceſs of the *Atlas*, and end near the *larger ſtrait* ones in the *Occeput*. There is not the leaſt Occaſion for any Separation, they being ſufficiently conſpicuous without it.

The *inferior* or *larger Oblique* Muſcles come in the Rear; which are by ſome number'd among the Muſcles belonging properly to the Head, but without any Reaſon, becauſe theſe Muſcles don't touch the *Cranium*; whence it is that they ought not to be numbered among the *Muſcles* of the Head: For by the ſame Rule, the *Oblong Muſcles* of the Neck might be attributed to the Head, they having, as well as the *inferior Oblique* Muſcles,

ſcles, their Inſertions in the *Atlas*. I am willing in this Point to follow the common Path, and to treat of them here. Their Origin is on the external Part of the Spine of the Second Vertebre; from whence they go upwards obliquely, to end in the tranſverſe Proceſs of the *Atlas*, where is the Origin alſo of the other oblique Muſcle.

N. B. The Three Muſcles, *viz.* the larger ſtrait Ones, and the Two oblique Ones, taken jointly, repreſent the Figure of a Triangle, the *Baſis* whereof is made by the *inferior oblique* Muſcle, and the two Sides, or *Latera*, by the reſt; and therefore are very eaſy to be diſtinguiſh'd one from the other, eſpecially ſince the *ſtrait* Muſcle makes up that *Latus* of this Triangle which is next to the *Spine*.

CHAP. VIII.

Of the Muſcles of the Neck.

THere are Four Pair of Muſcles belonging to the Neck, *viz.* two placed foremoſt which bend, and two behind which extend it.

The Operation of the two firſt Pairs muſt be performed whilſt the Carcaſs is laid on its Back; theſe are the *Longi*, or *Oblong* Muſcles, and the *Scaleni*.

The *Scaleni* having their Riſe on the firſt Rib, and ending in the tranſverſe *Apophyſes* of the *Vertebræ*, become conſpicuous as ſoon as you have finiſh'd your Separation of the before recited Muſcles; and conſequently their Separation is plain and eaſy. But in caſe you intend to diſſect them whilſt the other Parts are remaining as yet entire, this Operation wants ſome further Obſervations. The main Thing, and which is peculiar to them, is the Paſſage of the *axillary* Veins and Arteries, which take their Courſe thro' this Muſcle to the Arm: Therefore you muſt be careful not to wound them, otherwiſe you muſt expect to be troubled without Intermiſſion with an Effuſion of Blood. Firſt of all then take off the Muſcle *Maſtoideus*, of which before; and ſeparate alſo the *Levator* of the *Scapula*, placed on the Outſide, and having its Riſe in the ſame Place where this ends. Then ſeparate it from the Rib, and cut it off at its Origin.

The Second Muſcles that bend the Neck are the *Longi*, being placed on the Sides of the Bodies of the *Vertebræ* of the Neck. Their Origin is commonly taken from the Fifth of the *Thorax*; but Nature varies in this Point, becauſe ſometimes they ariſe from the Fourth, nay even from the Third *Vertebra*, and end in the *Tuberculus Atlantis*, and ſometimes alſo in the *Occiput*, as *Columbus* has very well obſerved. They muſt be ſeparated by ſhaving or abrading them off with your Knife from the Sides of the *Vertebræ*.

Betwixt the laſt *Vertebra* of the Neck, and the firſt of the *Thorax*, you will ſee the *Vaſa Cervicalia* to paſs at the Perforations of the tranſverſe Proceſſes of the Neck. If you propoſe to have a full View of the other two Pairs, you muſt turn the Carcaſs. Neither muſt you ſuppoſe to get Sight of them immediately after you have ſeparated the Skin; but you muſt alſo remove beforehand the *Trapezius*, the *Rhomboides*, the *Serratus Poſticus Superior*, the *Splenius*, and the *Complexus*. Nay, even the *Demi-ſpinatus* belonging to the Back will be in ſome Meaſure in your Way, and hinder your coming at their Origin.

All theſe Obſtacles therefore being firſt removed, you will then diſcover the Muſcle call'd the *Spinatus* in its natural Poſition, being join'd to ſome of the uppermoſt *Spines* of the *Vertebræ* both of the Back and Neck.

Under this is placed the Muſcle call'd the *Tranſverſarius*, having its Riſe from Six tranſverſe Proceſſes of the *Vertebræ* of the Back, and its Inſertion in all the *Vertebræ* of the Neck, filling up all that Space which is betwixt the tranſverſe and oblique Proceſſes. It muſt be ſeparated from the *Spinatus* by making an Inciſion, by that Line by which they are diſtinguiſh'd. You can't miſs of finding it out, if you ſeparate the *Spinatus* belonging to the Back, under which lies concealed the Origin of the *tranſverſe* Muſcle, and afterward continue your Separation upwards. Then you muſt alſo ſeparate it from the tranſverſe Proceſſes, but take Heed you don't mangle the tendinous Iſſues or Productions.

The

The *Spinatus* of the Neck wants no further Separation, after its being once clear'd of the *tranſverſe* Muſcle.

CHAP. IX.

How to ſeparate the Skin and Fat from the Foot.

THoſe that did take Notice of that Operation which was explained by us in the firſt Chapter of this Treatiſe, will ſoon be convinc'd, that they are already well acquainted with the beſt Part of what belongs to this intended Separation. For there is ſo exact a Congruity betwixt both, that there are but few Things, and thoſe of very little Moment, in which they admit of any Difference. But notwithſtanding this Difference be very inconſiderable, I thought it requiſite not to paſs it by in Silence, for Fear leaſt the young Students in Anatomy might be miſled into an Error by ſuch an Omiſſion.

The Inciſion therefore of the Skin muſt be made firſt of all in the *Pubes*, and from thence continued all along the Inſide of the Foot to the *Mola*. Then turning your Hand a little towards the back Side, put an End to this Section in the Calf behind the *Malleolus Internus*. Then make a Second Inciſion, ſo as to make a ſtrait Angle with the firſt, diſſecting the Skin of the Foot up to the Nail of the great Toe; and this done, ſeparate the Skin in the ſame Manner as had been told before in the Hand. The greateſt Difficulty here is in the *Tibia* or Leg, by Reaſon of the ſubjacent Fat, which is very ſoft, as well as on the back Side of the Foot. *Galen* does not ſeparate the Skin on the Bottom of the Foot, no more than in the Palm of the Hand; nay, does not ſo much as touch it, by Reaſon of the Expanſion of a certain Tendon ariſing from the *Muſculus Plantaris*. But there needs not ſo much Caution, becauſe that Skin may very well be ſeparated without impairing that Tendon.

'Tis further to be obſerved, That there is a membranous Muſcle in the *Femur* or Thigh, which encloſing divers other Muſcles, has thence got the Name of the *Faſcia*. This Muſcle, tho' it be carneous near its Origin, yet ſoon after degenerates into a broad Tendon, or rather a Membrane; which you muſt take particular Notice of; for if you do otherwiſe, you may ſoon miſtake it for the *Panniculus Carnoſus*, and cut it off, which I have ſeen often done by Miſtake.

To avoid therefore this Error, when you intend to ſeparate the Fat, make your Inciſion at the Origin of this Muſcle; which is on the lowermoſt *Spine* of the *Os Ilium*; and at the ſame Time take Heed not to let your Knife ſlip in too deep, for if you do, you will certainly wound the Membrane of the Muſcle; and if you perceive the muſculous Fleſh expoſed to your Sight, you may reſt ſatisfied that you have made your Inciſion deeper than it ought to have been.

Furthermore, when you ſeparate the Fat on the Bottom of the Foot, you muſt not begin at the Calf, and ſo go on toward the Toes; but make your Beginning on the Side of the great Toe, near the other Toes; and be careful not to take away at the ſame Time with the Fat that *Nervous Expanſion*, which ſtretching all along the Bottom of the Foot, is inſerted into the firſt Joints of the Toes, and is interwoven, as it were, with the Fat. Round the Calx lies a good deal of ſolid Fat, which muſt all be removed, before you can have a full Sight of the *Chorda magna*.

CHAP. X.

Of the Muſcles of the Thorax, *and of the Loins.*

THE Muſcles of the *Thorax*, called by ſome the Muſcles of *Reſpiration*, are both very numerous and very different: For they tell us, that thoſe that are ſubſervient to Reſpiration are the *Serratus major*, of which among the Muſcles of the *Scapula*, the *Subclavii*, the *Triangular*, the twenty intercoſtal Muſcles on both Sides, and the ſingle Muſcle of the *Diaphragm*, of which we have treated in the Second Book. It remains therefore only for us to explain in this Place the Muſcles called the *Serrati Poſtici*, as well the ſuperior as the inferior Ones.

The Muſcle called the *Serratus Poſticus ſuperior* lies under the *Rhomboides*, being of a ner-

ervous Subſtance, and ariſing at the three nferior *Spondyli* of the Neck, and the firſt f the *Thorax*. This nervous Expanſion affes over, and in ſome Meaſure encloſes e Muſcles of the Loins and Neck, whence it is that ſome have taken it for a Ligament. t is very ſmall, and ſomewhat carneous ear its End, where it is inſerted in the hree Ribs, which it draws upwards. Its eparation depends altogether on its Diſ- ection at its Origin; which being done, ou can't miſs of finding its End.

The Muſcle called the *Inferior Serratus* lies nder the *Latiſſimus Dorſi*, being cloſely nited to its tendinous Origin, which be- ng ſeparated, it becomes conſpicuous. Its Origin is at the laſt *Vertebræ* of the Back, nd the firſt of the Loins; being nervous ike the preceding Muſcle, and encloſes the Muſcles of the Loins. Its Inſertion is in he lowermoſt Ribs, which it moves down- wards, and there it is carneous. Its Separa- ion is the ſame with that of the foregoing Muſcle. Now we muſt come to the Muſ- cles of the *Loins*.

The firſt Muſcle that comes in your Way o be ſeparated is the *Sacro Lumbus*, being placed on the outermoſt Side among theſe Muſcles on the Ribs. Its Origin is at the very Extremity of the Rib of the *Os Ilium*, whence it diſperſes its tendinous Branches to all the other Ribs. You muſt ſeparate it from the Muſcle called the *Longiſſimus Dorſi*, from which it is divided by a yellowiſh ſtreak, being nothing elſe but the Fat that lies betwixt them. You muſt be ſure to follow the Tract of this Streak, and then you are ſecure not to miſs. Its Separation from the *Longiſſimus*, near its Origin, is ſomewhat difficult; becauſe the Origins of theſe Muſcles are ſo deeply intermix'd with the Muſcle called the *Sacer*, that it is next to an Impoſſibility to make an exact Di- ſtinction betwixt them. It muſt be ſepara- ted from the Ribs by Abraſion or Scraping, except the *nervous* ſmall Branches, which muſt be left behind. On the Loins you muſt ſeparate it from the Muſcle called the *Qua- dratus*, which lying under it, you muſt put in your Diſſecting Knife ſideways.

The next Muſcle is that called *Longiſſimus Dorſi*, being contiguous to the *Sacer*. It ex- tends along the whole Back to the Neck, and ſometimes even to the *Occiput*. It is join'd to the Spines of the *Os Sacrum*, and of the Loins, by its tendinous Membrane. You muſt begin your Inciſion in this Mem- brane, and clear it of the ſubjacent Muſcle called the *Sacer*, which will bring you of Courſe to the upper Parts, and ſhew you where it is divided from the adjacent Muſ- cles. Then ſeparate the muſculous carneous Part from the Bones, that ſo you may have a full View of the *Anſulæ* or ſmall Branches, or Hooks.

The Muſcle called *Sacer* being the next to this, both in its Origin and Progreſs, has got its Name from its Riſe out of the *Os Sa- crum*. It lies extended over the tranſverſe Proceſſes of the Loins, and thence to the *Vertebres* of the *Thorax*, under the Muſcle *Semiſpinatus*. It ſeems ſcarce to require any Separation, there being nothing under it but the Bones.

The Origin of the *Semiſpinatus* is placed at the Extremity or End of the preceding Muſcle. Its Origin being at the ſpinous Proceſſes of the Loins, and contiguous to all the *Vertebra* of the Back, at laſt it hides it ſelf betwixt the *Spinatus* and *Tranſverſalis*. If you intend to ſeparate it, do it with your Knife by Way of *Abraſion*, or Scraping it from the Bones. *Riolan* calls it the *Spinatus*, and deduces its Origin from the *Spines* of the *Os Sacrum*.

After you have removed the Origins of the *Sacer*, and of the *Longiſſimus*, you will ſoon get Sight of the *Quadratus*, or Four- Square Muſcle of the Loins. It has its Riſe on the *Spina* of the *Os Ilium*, and ends in the *tranſverſe Apophyſes* of the Vertebres of the Loins; and at the lowermoſt Rib being altogether of a carneous Subſtance. You muſt begin with your Inciſion at the *Spine*, and after having ſeparated the Muſcle from the Proceſſes, cut it off at the lowermoſt Rib.

CHAP.

CHAP. XI.

Of the Muſcles of the Thigh and Leg.

I Judged it abſolutely requiſite to treat of the Muſcles of theſe two Parts of our Body at once, becauſe the Diſſection of the Muſcles of one of them can't be performed without the other, as will be apparent from the following Chapter. In the fore Part you muſt ſeparate the Muſcles in the following Manner:

Firſt of all, you muſt remove the Muſcle *Sartorius*, which ariſes from the lowermoſt *Spina* of the *Os Ilium*, and running obliquely over the Muſcles of the Thigh, is inſerted on the Inſide of the *Tibia* or Leg. 'Tis alſo called the *Faſcialis*, and the *Sutorius*, and may be eaſily ſeparated with your Hand, only by putting your Finger betwixt this and the *Rectus*, and thus to part them only by drawing your Finger up and downwards.

The next to be ſeparated is the Muſcle called the *Membranoſus*, otherwiſe the *Faſcia Lata*. It incloſes almoſt the whole Thigh, eſpecially on the Inſide. Its Inſertion, according to my Opinion, is at the Leg; tho' *Riolan* ſays it goes down to the Foot properly ſo called. It has its Origin from the *Spina* of the *Os Ilium*, near the *Faſcialis*, where you muſt alſo begin your Inciſion, and ſeparate its fleſhy Part, which lies concealed betwixt the other Muſcles. Then you muſt ſeparate alſo the nervous Membrane with your Diſſecting Knife, which always ſticks very cloſe to that Part where theſe two Muſcles meet. It adheres alſo very cloſe to the Knee, under the Joint, and ſeems to be inſerted there. You muſt in this Operation often turn the Leg, becauſe this Membrane encloſes the Thigh both on the In and Outſide.

Before you go further, you muſt not forget to obſerve, that certain Veins and Arteries paſs over the *Oſſa Innominata*, together with the Muſcle called the *Pſoas*, and the *Iliacus Internus*: For here thoſe large Branches called the *Crurales* deſcend to the Foot. For theſe, after they are gone beyond the *Os Pubis*, ſend forth a large Branch, which paſſing through the Inſide of the Thigh and Leg, makes the *Saphæna* near the *Malleolus Internus*; but the Trunk it ſelf goes deeper inwards, betwixt the *Vaſtus Internus* and the *Crureus*, near the Tendon of the *Iliacus Internus*.

Having made your Obſervations here, you will in the ſame Place meet with the *Rectus*, having got its Name from its ſtrait Poſition: For it ariſes from the Margin of the *Spine* of the *Ilium*, and extends directly to the Knee, between the two Muſcles called the *Vaſti*, upon the *Crureus*. You may eaſily ſeparate it with your Fingers, like the *Sartorius*, or elſe with a Knife of Ivory.

The next in Courſe are the two *Vaſti*. The *Externus* has its Origin at the great *Trochanter*, and thence deſcends on the Outſide of the Thigh to the *Tibia* or Leg. Its Separation muſt be begun on the Outſide, and therefore you muſt turn the Thigh, that ſo you may ſeparate it from the *Biceps*, unto which it is cloſely united. You muſt alſo ſeparate it with your Diſſecting Knife from the *Crureus*, in that Place where you ſee theſe two Muſcles joined together by a white Streak or Line.

The *Vaſtus Internus* is placed on the oppoſite Side, owing its Origin to the leſſer *Trochanter*. It is alſo diſtinguiſhed from the *Crureus* by a white Streak, where you muſt ſeparate it with your Diſſecting Knife, and afterward on the Backſide from the Muſcles called the *Gracilis* and the *Triceps*.

The *Crureus* immediately ſurrounds the Thigh, whence it muſt be ſeparated by *Abraſion* or Scraping.

Theſe three Muſcles, together with the *Rectus*, join in one Tendon, which ſurrounds the *Mola* or Knee-pan, and keeps the Knee ſteady; and therefore theſe Muſcles being ſo nearly contiguous that they may very well be taken for one threefold Muſcle, you may enter upon their Diſſection at once thus: Separate the *Patella* or Knee-pan on the Inſide, near the Flexure of the Knee, from the Thigh, by the Help of your Diſſecting Knife, and continue your Section, by deſcending gradually under the *Vaſtus Internus*. So ſoon as you come to the *Thigh-Bone*, clear it of the muſculous Fleſh; and then repeat the ſame Operation on the oppoſite Side, under the *Vaſtus*. You muſt cut away the *Heads* of the *Vaſti*, and ſeparate the *Crureus* from

from the Bone; but take Heed not to impair the *Head* of the *Biceps*, which is placed on the Outside. After having removed these Muscles, you may divide them into their proper Parts.

On the Inside you will also meet with the Muscle called *Gracilis* or the *Slender*, Surnamed the *Posticus* by *Riolan*, to distinguish it from the *Rectus*, unto which he has also given the Name of *Gracilis*. It arises near the Juncture of the *Os Pubis*, and ends betwixt the Legs, near the Thigh: It is easily separated by Way of Excoriation.

After you have dissected these Muscles, you must go upwards again, in order to take a View of the Muscles called the *Psoas* and the *Iliacus Internus*.

Psoas is called that round Muscle, which arising from the Vertebres of the Loins, and running over the *Os Ilium*, is inserted betwixt the two *Trochanters*. Upon this you will often meet with another Muscle (found out first of all by *Riolan*) called the lesser *Psoas*, which must be taken off first. It is round and fleshy, and has its Origin at the first *Vertebra* of the *Loins*; but soon becoming slender, degenerates into an oblong Tendon, which is joined to the Bones of the *Ischium*. I have observed this Muscle in a *Cercophitecus* or Monkey to be of the same Bigness with the greater *Psoas*, because it is of great Use in performing the Acts of Gesticulations in this Creature. The Tendon of this Muscle being placed upon that of the greater *Psoas*, you may separate with your Finger; then clear its Origin from the Vertebres, and cut off the Tendon at the *Os Ilium*; because, unless you do so, its Position will hinder your Operation in the following Muscles.

If you intend to separate the greater *Psoas*, begin at the Vertebres, and having separated it there, clear it also from the *Iliacus Internus* with your Dissecting Knife, continuing your Section downwards till you come to the Thigh Bone, where you will see its Insertion. In the mean Time, you must not forget to take Notice of that Nerve, which together with this Muscle passes over the *Sinus* of the *Os Ilium*, being the same which occasions that Benummedness in the Foot which is felt by those that are afflicted with the Stone. It has its Rise, and sprouts forth out of the *Spinalis Medulla* or *Spinal Marrow*, betwixt the Third and Fourth *Vertebra* of the Loins.

Upon this is placed also another Muscle, called the *Iliacus Internus*, which covers and fills up the whole concave Part of the Inside of the *Ilium*, called by *Riolan* the *Belly*. It descends the same Way with the *Psoas*, above the *Ischium*, to the Thigh; but is not inserted in the *Trochanter*, but on one Side of it. Its Separation is to be performed by making an Incision at the Margin of the *Os Ilium*, and then to separate it by Abrasion from its Concavity, and after this to continue your Separation to its Insertion. During this Operation, bend the Thigh a little forward. Whilst the Carcass is lying on the Back, you must also examine the Muscle called commonly the *Triceps*; but *Riolan* says, it ought rather to be called the *Quadriceps*, or *Quadrigeminus*, by Reason of its Four Heads, and as many Insertions. But you must know, that *Riolan* reckons among these Four the *Lividus*, which is by other Anatomists reputed a peculiar Muscle. He himself is obliged to confess this, when he adds, that it seems to be a peculiar Muscle, and therefore also gives it a peculiar Name, *viz.* that of the *Pectineus*.

This *Pectineus* arises from the *Pecten*, or the superior Part of the *Os Pubis*, and runs along the Inside of the Thigh to the *Opiphysis Inferior*, where its Insertion is. If you consider it as a separate Muscle, you may dissect it also separately, without the *Triceps*, which is easily done, only by making your Incision in the Membrane which joins them together. But if you still take it together with the *Triceps*, you must delay this Operation till you have separated the Muscles on the Backside.

However, before you leave off here, you must not forget to take Notice of the great Branches of the Veins and Arteries, which pass at the Conjunction of the *Pectineus* and the *Triceps*, and going to the Backside, and being joined under the Knee by a Nerve, hide themselves under the *Gasterocnemii*. To get Sight of these Vessels, you must turn the Leg obliquely outwards.

All this being done, turn the Carcass, by Reason of the Muscles placed on the Backside. First of all, you will see here a large

Muſcle called the *Glutæus*, having its Riſe partly from the *Os Ilium*, partly from the *Os Sacrum*, and ſpreading in Part over the *Glutæus medius*, deſcends to that Space which is betwixt both the *Trochanters*. The better to diſpatch its Separation, begin on the Outſide, and make an Inciſion in a ſtrait Line in its Membrane, which is very ſtrong, and then with your Finger ſeparate it to its Origin, when you may cut it off, beginning at the Spine of the *Os Ilium*, and continuing your Section to the *Os Sacrum*, and then trace it to its End, which is below the *Trochanter major*, unto which it is ſo cloſely united in its Paſſage, that you muſt divide it by the Help of your Diſſecting Knife.

The Muſcle called the *Glutæus medius* ſprings from the Middle of the *Dorſum* of the *Os Ilium*, is placed upon the *minor*, and ends in the *Rotator minor*. Its Separation is near the ſame with the preceding, only take Heed you don't at the ſame Time ſeparate alſo the Muſcle called the *Pyriformis*, which adheres cloſe to the Outſide of it.

You may ſoon find the Interſtice, for the Vein that coming from the fore Part paſſes betwixt theſe Muſcles, will be a ſure Guide to you.

The Muſcle called the *Glutæus minor* is ſpread almoſt all over the *Os Ilium*, and paſſing over the Head of the Thigh, is inſerted in the ſame Place with the former. *Riolan* thinks the Separation of this Muſcle needleſs, becauſe nothing lies under it. But if you are inclined to do it, you may ſeparate it by Way of *Abraſion* with the Back of your Diſſecting Knife from the Bone, and cut it off wherever elſe you find it coherent to others.

Next to theſe come the Muſcles called the *Quadrigemini*, and the *Obturatores*.

The firſt among the *Quadrigemini* is the *Pyriformis*, or the *Iliacus externus*. It ariſes round and carneous on the Backſide from the *Os Sacrum*, but ſoon after growing much ſlenderer, ends with a very ſtrong Tendon in the Concavity of the *Rotator major*. You may ſeparate it on the Sides from the Second *Quadrigeminus* with your Knife, and then continue your Section to its Origin, and cut it off there. Near this Muſcle you will obſerve the thickeſt Nerve of the whole Body to paſs toward the Thigh, and conſequently to the Leg. It takes its Courſe in the middle, betwixt the *Biceps Semimembranoſus* and *Seminervoſus*, ſending forth its ſmall Branches into the adjacent Parts; but a little above the Knee it is ſplit into two Branches, one of which goes downward on the Inſide to the Foot, the other hides it ſelf above the *Popliteus*, under the *Gaſtrocnemius* and *Soleus*

The Second and Third *Quadrigemini* are contiguous in their Origins, Middle, and End, being diſcernable from one another only by a whitiſh Streak or Line, which being cut aſunder, the Tendon of the Muſcle called the *Obturator internus* begins plainly to appear. Some will have theſe not to be numbered among the Muſcles properly ſo called, but ſay it is only a carneous Involucre, in which the *Obturator internus* is contained like as in a Purſe, whence ſome have given it the Name of *Burſalis*, others that of *Marſupinalis*. However you may diſſect theſe Three Muſcles at once; and here you muſt obſerve, that there is a *Foramen* in the *Os Coxæ*, on the interior *Labrum* of which grows the *Obturator internus*, whence you muſt ſeparate it, by conveying your Knife into the *Pelvis*, and abrading it from the Bone. Keep cloſe to this Tract till you come to the two Muſcles, the Second and Third *Quadrigemini*, one whereof is placed upon the other under the *Obturator*, which they ſhow, and on all Sides remove theſe alſo at once; and ſo you will come to the Inſertion, which is in the *Sinus* or Concavity of the *Trochanter major*. After you have ſeparated them from the Bone, you may alſo take them aſunder, if you pleaſe, by dividing the *Carneous Purſe* into Two Parts.

The Muſcle called the *Quadratus*, the Fourth among the *Quadrigemini*, is placed near the Second and Third. *Riolan* ſays, they are two Inches Breadth diſtant from the preceding Muſcles; but this is not agreeable to ocular Experience, becauſe it lies cloſe to them. Theſe being removed, it will ſoon appear, when you muſt ſeparate it from the *Obturator internus* that lies under it. Therefore begin your Separation on the upper Side, and lift up the *Quadratus* with a ſmall Hook. Then convey your Knife within

in the whitiſh Streak which diſtinguiſhes it from the other by its extended Fibres, ſeparate it underneath, and then cut it off at its Origin. You muſt delay the Anatomy of the *Obturator externus*, till after the Removal of the *Triceps*.

In the hindermoſt Part of the Thigh, you have the Muſcles called the *Biceps*, the *Seminervoſus*, and the *Semimembranoſus*.

The *Biceps*, whoſe firſt or largeſt Head ariſes from the Protuberancy of the *Os Iſhium*, the other and ſhorter is faſtened to the Thigh, and placed near to the next following Muſcles. Its largeſt Head muſt be ſeparated from the *Semimembranoſus*, and the *Seminervoſus*, and be cut off of the Protuberancy of the *Os Iſhium*. The ſhorter Head ſticking very cloſe to the Thigh, muſt be ſeparated with Caution, and therefore you muſt take it off of the Bone of the Thigh by Way of Abraſion, or by Pulling. The Tail or End muſt be cut off of the Bone of the Leg.

Unto this are contiguous on the Inſide the *Seminervoſus* and the *Semimembranoſus*, being alſo the ſame with the preceding in their Origins, Progreſs, and Inſertion. The only Difference lies here, that the former is placed on the Outſide, and has a long and ſlender Tendon toward the End, whereas this on the Inſide near the *Triceps*, has a broad *Aponeuroſis* at its Origin.

They muſt be ſeparated as well from the *Triceps* as from one another by Way of Excoriation.

Now it is Time alſo to come to the Separation of the *Triceps* and its ſeveral Parts. Their Heads ſpring all from the *Os Pubis*, but in different Places: The firſt grows to the ſuperior Angle, the Second to the middle of the Bone, and the Third to the lower Part. Their Heads, as well as their Inſertions, are only at a ſmall Diſtance from one another; for that Inſertion which is on the lower Part of the Thigh anſwers the firſt Head, the next to the Second, and the Third to the Third Head; according to which Obſervations, you muſt regulate your Separation of the Parts of theſe Muſcles; for 'tis impoſſible to give you any better Directions.

This Muſcle being removed alſo at laſt, you have a full View of the *Obturator externus*. It is placed under the *Quadratus*; but ſo deep, that its Separation could not be attempted immediately after it, and therefore muſt of Neceſſity be delayed till now, when every Thing elſe being taken away, this Muſcle is left behind alone, and therefore it would be needleſs to inſiſt here upon its Separation.

CHAP. XII.

Of the Muſcles placed on the Leg.

ON the Backſide of the Leg are a great many Muſcles. The firſt are thoſe called the *Gaſterocnemii*, called the *Gemelli* or Twins, by *Riolan*. They ariſe from the *Epiphyſis ſuperior* of the Leg, and extend over the Muſcles called the *Soleus* and *Plantaris*. You muſt begin their Separation on the Inſide, and make your Inciſion in that ſtrong Membrane lengthways, which ſurrounds the whole Leg; and then you may ſeparate it from the *Soleus* by the Help only of your Finger, which will guide you to their Heads, which you muſt cut off. Their fleſhy Bellies are divided in two Parts by a white Streak, which being diſſected, you may alſo ſeparate them from one another.

Under theſe is placed the *Plantaris*, which here anſwers to the *Palmaris* in the Hand. It ariſes fleſhy and ſlender from the Tubercle of the lower *Epiphyſis* of the Thigh Bone, and ſoon after runs into an oblong Tendon, which all along the Sides of the *Gaſterocnemii* deſcend to the *Os Calcis*, and there adheres cloſe to it, together with the Tendons of the *Soleus* and the *Gaſterocnemii*. That nervous Body which expands it ſelf thro' the Concavity, or the Sole of the Foot, is ſuppoſed by ſome to be Part of this Muſcle; but I never have been able as yet to find out its Connexion with it. Make yout Inciſion in the Membrane above the Tendon, and ſo go upwards till you come to the Origin; then go on downwards again to the *Calcacium*, to try whether you find its Coherency with the nervous Expanſion.

Now follows the *Soleus*, having a pretty large fleſhy Belly, which ariſing from the

Fibula, extends it ſelf obliquely inward, and deſcending, covers the Muſcles placed on the back Part of the Leg.

This Muſcle intermixes its Tendon with the Tendons of the *Gaſterocnemii*, which being join'd in one *Tendon*, make up what is called the *Chorda magna*, or the *Nervus Ignarus*, as *Celſus* calls it, being the ſame on which the Butchers hang up their ſlaughter'd Beaſts. Its Separation muſt be begun at the Tendon, and ſo going upwards to its Origin. Its End is joined to the Side of the *Calx*, where you may cut it off if you think fit.

Theſe Muſcles being removed, the next that appears is the *Poplitæus*, or the *Subpoplitæus*. Its Seat is in the Juncture of the Leg and Thigh. Its Riſe on the Inſide of the Thigh, and runs obliquely above the Head of the Bone called the *Peritonæum*, to the Head of the Leg, where it ſometimes ends, ſometimes goes a little beyond it. If you intend to ſeparate it, you muſt begin on that Side which is next to the *Perone*, and ſo going upwards gradually from the Ligament which encloſes its Origin, ſeparate it, till coming to its Origin you may cut it off.

Now you muſt come again to the Muſcles placed betwixt the Leg and the *Fibula*, where I am willing to tell you beforehand, that you muſt not expect here an ample Account of the Method of ſeparating them, becauſe I judge it ſuperfluous, being altogether the ſame with that preſcribed in the Separation of the Muſcles of the *Cubitus*. Wherefore I will confine my ſelf to this Point only, *viz.* to ſhew you their Riſe, Progreſs, and Inſertion, not queſtioning but when this is done you may very well accompliſh their Separation.

In the upper Part, where the *Fibula* or the *Perone* lies ſomewhat open, is placed near it the Muſcle called the *Beronaus Piceps*, or the *double-headed*, having its double Origin on the upper and middle Part of the *Perone*. In its Way the uppermoſt Head adheres to the *Fibula*, and the *Cnemodactylius*, and its lowermoſt Head comes near to the *Extenſor* of the great Toe. It runs thro' a Ligament like a Channel under the *Malleolus externus*, to the *Metapedium*, and by one of its Tendons is joined to the Fifth Bone of the *Metatarſus*: By the other, it paſſes the Sole of the Foot, and ends under the great Toe. *Riolan* makes this a double Muſcle, dividing it into the *Peronæus externus* and *internus*. This Muſcle ſeems to me in this Place to anſwer the Functions of the *Bicarnis*, or the exterior *Radicus* in the Hand, and therefore might alſo not improperly be called ſo. You may ſeparate it by making an Inciſion in the Ligament under the *Malleolus* like the *Bicarnis* in the Hand, by which Means the Bone *Perone* will be laid open.

Near unto the former is placed the *Extenſor longus* of the Toes, called otherwiſe the *Cnemodactylius*, which ariſing from the Head of the Leg, runs along the Side of the *Tibiæus anticus* to the Back of the Foot, and its Toes. Its Separation is the ſame with that of the *Extenſor longus* in the Hand.

With this is join'd in its Paſſage, and and in ſome Meaſure intermix'd in its carneous Subſtance, the *Peronæus Flexor*, ſo called, but not deſcribed, by *Riolan*. It ariſes from the middle of the *Fibula*, and paſſing, together with the Tendon of the *Cnemodactylius*, thro' the *annular Ligament*, ends betwixt the Fourth and Fifth Bone of the *Metapedium*. What Name has been given to this Muſcle by other Anatomiſts, I will not pretend to determine in this Place.

Betwixt this and the next following Muſcle is placed the *Extenſor* of the great Toe, having its Riſe at the Middle, on the Outſide of the Leg, and going downwards together with the *Cnemodactylius* to the Toes, but more eſpecially to the great Toe; but before it reaches ſo far, it is divided into two diſtinct Tendons, which are inſerted alſo into two diſtinct Joints of the great Toe. One of theſe Tendons, being the ſhorteſt of the two, joins with the Tendon of the Muſcle *Pediæus*.

The Muſcle called the *Tibiæus*, or *Tibialis anticus*, lies near to this, and the Bone of the *Tibia* or Leg, where it has its Riſe, and ſo deſcends to, and is inſerted in the firſt Bone of the *Metapedium*, and ſends forth a Branch to the Joint of the great Toe. Hence it is that we can ſcarce bend our Foot without moving and extending at the ſame Time the great Toe.

This

This Muſcle being removed, you then may ſee the Ligament which joins the Leg and the *Fibula*.

On the oppoſite or the interior Side backwards, are placed Three other Muſcles. The Firſt is the *long Flexor* of the Foot, or the *Perodactylius*, which muſt alſo be ſeparated. It ariſes from the interior and upper Part of the *Fibula*, paſſing in its Way over the *Tibiæus Poſticus*, near the Foot, and thro' the *Malleolus Internus* turns off to the fleſhy Maſs wherewith it joins its Tendons.

The Second is the *Tibiæus Poſticus*, which, like the *Anticus*, grows altogether to the *Tibia* or Leg. It likewiſe takes its Courſe under the *Malleolus* to the concave Part of the Foot, and paſſing cloſe firſt to the *Os Naviculare*, and next to the *Cubiforme*, is join'd to them.

The Third is the *Flexor* of the great Toe, which having its Riſe in the *Fibula*, goes on to the great Toe under the *Malleolus Internus*, where its Tendon joins alſo near unto the *Oſſicula Seſamoidea*. If you intend to diſſect theſe Muſcles, you muſt firſt of all make an Inciſion in that Ligament which keeps together their Tendons under the *Malleolus*, and then ſeparate their Origins thus far; but you muſt not go further, till after having accompliſhed the Diſſection of the Muſcles placed on the Foot, which ſhall be the Subject of the next following Chapter.

CHAP. XIII.

Of the Muſcles placed in the Foot properly ſo called.

ON the Back of the Foot you will meet firſt of all the Muſcle called the *Pediæus*, or the *Short Extenſor*, having its Riſe from the *Talus*, and communicating its Tendons to all the Toes, except to the little One. You muſt ſeparate it from the Bones of the *Tarſus* with the Point of your Knife, and then form the *Aſtralagus*. Laſtly, clear the Tendons of the Bones of the *Metapedium*, in order to diſcover their Connexion with the Toes. On the ſame Backſide of the Foot are alſo the Muſcles called the *Interoſſei externi*, which muſt be ſeparated at the ſame Time with the *Interni*.

Under the Foot, at the Sole, are a great many Muſcles; wherefore turning the Foot, firſt of all ſeparate the nervous Expanſion there, together with the Fat, which muſt be taken away firſt with a great deal of Caution, becauſe this Tendon ſticks very cloſe to the Muſcle called the *Flexor Brevis*, snd is conſequently very hard to be ſeparated from it. But don't be diſmayed, for all that is extraordinary is difficult, but rather take freſh Courage, in Hopes of bringing your Anatomy, carried on ſucceſsfully to this lower Part, to a happy Concluſion. You muſt firſt of all ſeparate this Expanſion from the firſt Joints of the Toes; and thus, in order to open your Way to this Muſcle, you muſt gradually and eaſily ſeparate the carneous Fibres by the Help of the ſharp Point of your Knife, from this extended Membrane, till you come to the *Os Calcis*.

This done, ſeparate the Muſcle called the *Flexor Brevis* of the Toe from the *Abductor* by the Help of your Knife, and cut off this from the *Calcaneum*, that ſo you may get a full View of the Tendons of thoſe Muſcles that have their Entrance in the Foot underneath it. Then ſeparate the ſame *Extenſor* from the *Abductor* of the little Toe, and cut it off likewiſe at the *Calcaneum*. Then ſeparate its Origin from the *Carneous Maſs*, that ſo you may diſcover the Inſertions of the Tendons in the Second Joint of the Toes. I have alſo made this following Obſervation, *viz.* That theſe Tendons have their Inſertions ſometimes in the Joints of three Toes only, which I ſuppoſe comes from thence, that the Second and Third Joints of the little Toe often grow together, as I have often found it in many Carcaſſes.

Furthermore, you muſt ſeparate alſo the *Carneous* or *Fleſhy Maſs* under the *Tarſus*, beginning at that Side which is next to the great Toe. In its Progreſs you muſt take Notice of its Conjunction with the *Flexor longus*, for it grows cloſe to its Tendons. Here the Muſcles called *Lumbricales* ſeem to have their Riſe, of which there are no more than Three here, becauſe the Fourth Toe has no ſuch Thing. You muſt therefore ſe-

parate

parate this *Fleſhy Maſs*, the Tendons of the *Flexor longus*, and the *Lumbricales Muſculi*, all at once, from the ſubjacent fleſhy Parts; they being ſo cloſely united, that they can't be divided till after they have been taken off. And here you muſt take Notice, that the Tendons of the *Flexor longus* perforate the Tendons of the *Flexor brevis*, juſt as in the Hand the *Sublimis* is perforated by the *Profundus*.

And now you will be able to ſeparate the *Flexor* of the great Toe, even to its Inſertion.

'Tis now Time you ſhould proceed alſo to the Diſſection of the *Abductor* of the little Toe. It ſeems as if it were a double, or at leaſt a double-headed Muſcle, which has its Riſe in the Fifth Bone of the *Metatarſus*, whereas the other takes its Origin on the Seat of the Foot. It muſt be ſeparated from the Bone in the ſame Manner as that Muſcle is done in the Hand.

The *Abductor* of the great Toe has the ſame Functions, and is alike in all Reſpects to the *Abductor* of the Thumb.

In the Hollow of the Foot there remains yet another fleſhy Subſtance, which adhering to the great Toe, is ſuppoſed to draw that along with it to the other Toes. Under the Bones of the *Tarſus* is a broad, thin, *Aponeuroſis*, which you may remove with your Knife, and then you have the Origin of this *Carneous* Subſtance, which being traced, brings you to the Inſertion: But beware you take not away the tranſverſe Muſcle, which lying under the Roots of the Toes, may be ſufficiently enough diſcover'd by its tranverſe Fibres. Thoſe which bring up the Rear are the *Interoſſei interni*, which are more protuberant than the external; but the Separation to be performed in the ſame Manner as the interoſſeous Muſcles of the Hand. Laſt of all, what is remarkable here, is the Progreſs of the Tendons of the *Tibiei Poſtici* and the *Peronæi Poſtici* under the Soal of the Foot; for, what happens in no other Part of the Body, they divide themſelves this Way and that Way; for one entering the Foot under the great Toe, joins to the little Toe nearer to the Bones; the other entering the Foot under the little Toe, runs to the great Toe.

Of the Skin, as the Cuticula, Cutis, *Veſſels, Glands, Pores, and Membranes of the Skin, with the* Membrana Adipoſa *and* Carnoſa. *From* Gliſſon, Malpighius, *and others.*

Of the Cuticle, *or* Scarf Skin.

THE Cuticle is a thin pellucid Membrane, void of Senſe, and ſerving as a Cover for the Skin.

Tho' it lies firſt expoſed to View, yet becauſe of its cloſe Coherence to the Skin, it is very rarely diſcerned from the Skin it ſelf, but by Anatomiſts, who generally ſeparate it by an actual Cautery, by which it appears to be a very thin and ſimple Membrane, which expoſed to the Microſcope, as ſome pretend, appears to conſiſt of Scales.

But if, inſtead of raiſing it by an actual Cautery on a dead Body, we examine that which is raiſed by *Cantharides*, or any other Veſicatory, we ſhall find it to conſiſt of ſeveral Membranes exceedingly thin and fine, and not altogether deſtitute of Bodes reſembling

mbling Glands, which in that State become visible to the Naked Eye.

It is extended over the whole Body, and being it self *insensible*, serves to defend the subjacent Skin, which is extremely *sensible*. It is full of innumerable *Foramina* or Perforations, as well for the *Hairs* as for the *Sweat* and *Effluvia* of the Body, which pass by *insensible* Perspiration, yet not so full but that it obstructs that excessive Discharge of Serous Humours, which otherwise would be evacuated by the *Glands* of the *Skin*, as appears plainly by the great Quantities discharg'd by *Blisters*, or any other Accident whereby the Skin is denudated.

Some would have it to be form'd from the grosser Part of the *excrementitious serous Humours*, eliminated through the Pores of the *Skin*, and condens'd upon the Surface, like the *Pellicle* which appears upon Evaporation on the Surface of the *Serum* of the *Blood*.

They that please themselves with this fancy, are at liberty to enjoy it; because, it is not a Point worth controverting. But Mr. *Lewenhoeck*, with more probability, thinks it to be an Expansion only of the excretory Ducts of the Glands of the Skin.

It has no proper Vessels, at least none that have been discover'd by Anatomists: Yet having had the Curiosity to examine several times the *Cuticle*, rais'd by *Vesication*, I have always found in it Glands, or Bodies like Glands, which were in that State pretty conspicuous and pretty numerous; from whence it seems to me certain that there are Vessels, though not discoverable by the Eye, nor perhaps in dead Bodies by the *Microscope*, because of the Coincidence and Flaccidity consequent of Death, which may easily cause Vessels so exceedingly minute to disappear. I could wish therefore, that they who are furnish'd with good *Microscopes* would examine the *Cuticle* taken off by *Vesication*, which I am perswaded *would discover* something yet unobserv'd.

Of the Skin.

IMmediately under the *Scarf Skin* or *Cuticle* lies a *Reticular* Body of Vessels peculiar to that Part, containing a mucous Liquor, from the Tincture of which the sagacious *Malpighius* imagines the Colour of the Skin to be derived; which Conjecture he draws from his Observation, that the *Skin* as well as *Cuticle* of *Blacks* is white, and that they differ in no other Circumstance from those of *Europeans*, but in this Particular.

The *Skin* itself is in several Animals of a Texture very various, as appears by the different Sorts of Leather made of *Skins*. That of *Hogs* and *Animals* which have a *Membrana Adiposa* spread immediately under the Skin, approaches nearest the Human, which upon the Score of the vast Multitude of *Sudatory* Pores, far exceeding in Number those of Creatures cloath'd with Hair, is more loose and Spungy. It consists of Fibres of its own, or according to *Steno* is form'd out of the Productions of the Tendons of the subjacent Parts, and furnish'd with an infinite Number of *Pyramidal Papillæ*, which are most conspicuous in the *Skin* of the Soals of the Feet, and of the *Palms* of the *Hands*, and are interwoven with innumerable *Nervous Fibres* which render it extremely sensible; and through those it becomes the immediate and proper *Organ* of the Sense of *Feeling*.

Among these likewise lie a vast Multitude of *Glands*, which are call'd the *Milliary Glands*, and are each of them serv'd with a Branch of an *Artery*, *Vein* and *Nerve*, as also a proper *excretory Duct*, thro' which the Matter of *Sweat* and *insensible Transpiration* is secreted, and sent forth at the Perforations of the *Cuticle*.

It is mark'd externally with a great Number of Lines, which intersecting one another at acute Angles, make generally a Rhomboidal Figure, though in some Places they are turn'd *Spirally*, as at the Ends of the Fingers: And in some likewise they are cut deeper, and are more apparent, as in the Palms of the Hands, and at the Flexures of the *Elbow* and *Hams*, and *Soles* of the Feet.

The Skin is perforated every where with Pores, which are by *Anatomists* observ'd to be of two Kinds, *greater* and *less*. Thro' the former of these the *Hair* germinates, which is implanted with a kind of *Bulbous Root* into the *Papillæ* before mention'd, as are likewise the Feathers in Fowls.

The *Skin*, by ordinary Computation, is estimated to be about six times as thick as the *Cuticle*:

Cuticle: But on the Head and Back, and under the Heel, it is much Thicker; in the Palms of the Hands and the Sides, on the Face and Forehead, and eſpecially on the *Lips* it is much Thinner. On the *Face*, *Penis*, and *Scrotum* it is ſofter than elſewhere; and on the *Neck*, *Back* and *Soles* of the *Feet* it is harder. But in different Subjects and *Climates*, there is, in reſpect of all theſe Things, a great Variety and Uncertainty.

The *Skin* is generally connected to the ſubjacent Parts by the *Membrana Adipoſa*, and its proper Veſſels, Arteries, Veins, Nerves and Lymphæducts, as well where there is no ſubjacent *Fat*, as where the Muſcles under it, as at the *Lips*, *Eyebrows* and *Anus*, ſend Fibres into it.

In ſome Places it adheres ſo very cloſely, that it is eaſily ſeparated, as about the Belly, Legs and Arms: Tho' in theſe, along the *Linea Alba*, it is more firmly connected, and on the *Soles* of the *Feet* and *Palms* of the *Hands*, ſo as not to be ſeparated without difficulty. On the *Forehead* it grows to the *Fleſh*, and almoſt all over the *Face*, eſpecially about the *Ears* and *Lips*, where the *Tendons* of the Muſcles end in it.

The Uſe of it is to wrap up and cover the whole Body, and to be a ſort of general *Emunctory*, and a proper Organ of Feeling.

The Diſeaſes of the Cuticle *and* Skin, *from the ſame Author.*

BOth the *Cuticula* and *Cutis* are liable to ſeveral Accidents or morbid Alterations, of which, thoſe of the *Cuticula* are moſt of them of little Moment, and ſcarce worth Minding; but for the Deformity which they bring along with them, ſuch as *Morphew*, *Freckles*, *Sun-burn*, &c. which are ordinarily cur'd with *Coſmeticks*, with which the *Ladies*, who are moſt Studious of their Beauty, are generally not unfurniſh'd.

The *Leproſy* only, both for its obſtinacy in Reſiſting all manner of Medicines, as well as for its Loathſomneſs, and ſometimes fatal Conſequences, may demand the Conſideration of a *Phyſician*, and properly enough in this Place: For tho' the Root and Cauſe may juſtly be thought to lie elſewhere, yet the viſible Seat of it is the *Cuticula* and Surface of the *Skin*.

This Diſtemper ariſes from the ſame Cauſe, that moſt other Diſeaſes of the *Cuticula* and *Cutis* do, but in a more exalted Degree; for all of them proceed from thin ſalt Humours thrown off from the Blood, and arreſted by the Denſity of the *Cuticula*, not affording them ſo free a Paſſage as the Quantity of them requires. This Diſeaſe is much more frequent in hot Countries than with us, where the Heat of the Sun rarifying extremely the Humours of the Body and ſubtilizing the Blood, cauſes and requires a more liberal Perſpiration, in the Courſe of which the *Salts*, in their own Nature Volatile, are ſtill more volatiliz'd, and thereby render'd more Acrimonious.

Concerning the *Lepra Græcorum*. Theſe *Salts* being by the Appointment of Nature to be eliminated thro' the Pores of the *Skin* along with the recrementitious *Serum* their proper Vehicle, are in hot Countries convey'd in greater Plenty to the Surface of the Body, by reaſon of the extraordinary Rarity of the Pores from the Heat of the *Climate*, than in theſe Northern Regions they ordinarily are, and ſticking in their Paſſage, in the thin dry Membrane of the *Cuticle*, the aqueous Parts, which are their Vehicle, ſlip away from them by inſenſible Evaporation, and leave them there to corrode and fret it, till at length, thro' the quantity ſo gather'd, the Membrane becomes dry, brittle and white, which is the true and ſole Cauſe of the *Deſquammation* or falling away in white Scales, which Whiteneſs as well as the *Brittleneſs* proceeds meerly from the Quantity of *Salts*, which are themſelves White, and when the Moiſture is drawn from them, being aculeated, and having inſinuated themſelves into the Pores of the *Cuticle*, diſſolve the Continuity of it by their Points and Edges, which ſo dry'd and broken, is apt upon the leaſt Attrition to fall off, as in the Manner above mention'd.

There is another kind of this Diſtemper, which is call'd *Lepra Arabum*, as the former *Græcorum*, from the Frequency of it in thoſe Countries, which tho' different in Appearance, carrying a dry ſcabby Cruſt, ſeems to me however to differ only in Degree. For as in the former Caſe, the *Salts* being left deſtitute of their Humidity, which was their Vehicle, are not ſo active, and therefore

fore affect only the *Cuticle*, to which they are immediately contiguous, or perhaps the Surface of the *Skin*, which is ſometimes made rough and uneven by them; in the latter Caſe, theſe *Salts* with their Vehicle crowding faſter than they can be evaporated thro' the Pores of the *Skin*, being ſtill in *Fluore* and ſo more *Cauſtick*, corrode deeper, and eat not only the *Cuticle*, but the *excretory* Veſſels, and Surface of the *Skin* it ſelf, which thereby ſpues out a Liquor ſomewhat thicker than uſual, which when the thinner and more aqueous are evaporated, is condens'd into that *Cruſt* or *Scab* which is the *Pathognomonick* of this Diſeaſe.

Thus the *Small Pox*, not having its Foundation in any permanent habitual Indiſpoſition, either of the Climate or Body, has its Period within a limited Time, ſufficient to extrude the Peccant Matter thro' the Pores of the *Skin*: For in this Diſeaſe, the *ſalt Serum* of the Blood by being an accidental Fever, ariſing from other Cauſes than the conſtant Habit of the Body, or Diſpoſition of the Climate, thrown in great Quantities upon the *Glands* of the *Skin*, acts much after the ſame manner with the Corroſive Matter in the *Lepra Arabum*; that is, it frets the *Cuticle*, and Surface of the *Skin*, much as the other does: But when the Blood is fully deſpumated, and no freſh extraordinary Supply is ſent to theſe Parts, the *Scabs* dry and fall off, and the *Skin* recovers its former State, except that the *Eſchars* of theſe Ulcers, which were then rais'd, generally remain viſible ever after. Yet ſometimes the Matter not being very corroſive, nor very plentiful, the Impreſſions it leaves are ſo light, that the *New Cuticle* that ſupervenes afterwards is ſufficient to obliterate them. Thus the Cauſe ceaſing, the Effect does ſo likewiſe.

If therefore any Body ſhould call the *Small Pox* a Temporary Critical *Lepra*, coming upon an extraordinary Occaſion, I ſee no Reaſon to impugn his Notion: And tho' the Treatment be, and ought to be different, it is becauſe more Reſpect is had to the internal accidental Cauſe, than to the external Symptoms, and their Effects upon the *Skin*.

Why the *Small Pox* ſeldom viſits any Perſon more than once in his Life-time, has been a famous *Problem* much agitated with very little Succeſs; and therefore if I ſucceed in my Attempt to reſolve it no better than others have done before me, I ſhall not think it any Loſs of Reputation, but ſhall freely wiſh others more happy in theirs, when they undertake to reform my Notion.

I conceive therefore, that the Alteration made in the *Skin* by the *Small Pox*, at whatever Age it comes, is the true Reaſon why that Diſtemper never comes again. For the Diſtention, which the *Glands* and Pores of the *Skin* ſuffer at that time, is ſo great, that they ſcarce ever recover their *Tome* again, ſo as to be able any more to arreſt the Matter in its Courſe outwards long enough, or in ſuch Quantity, as to create thoſe *Ulcerous Puſtules* which are the very *Diagnoſticks* of the *Small Pox*: For tho' the ſame *Feveriſh* Diſpoſition ſhou'd, and may again, ariſe in the Blood, yet the Paſſages thro' the *Skin* being more free and open, the Matter will never be ſtop'd ſo then as to make that Appearance from whence we denominate the *Small Pox*.

Accordingly, we generally obſerve that in thoſe Perſons, who have been ſeverely handled by the *Small Pox*, the Face which is generally the fulleſt from the Obſtruction, which the Matter meets with upon the account of the greater Conſtipation of the Pores of the *Cuticle*, by reaſon of its being conſtantly expos'd to the Air, ſeldom returns to its former Dimenſions. This Enlargement I think is to be accounted for, from the Dilatation of the *Areole* of the *Glands*, and Pores of the *Skin*, and not from any Augmentation of the Subſtance it ſelf.

I am the further confirm'd in this Opinion from the Obſervation, that Nurſes and others, that attend cloſely upon Perſons ſick of the *Small Pox*, are frequently ſo far affected with the Diſtemper, as to feel ſome very light Diſorder, and with or without that Warning, to have two or three Eruptions. That it comes to no more, I attribute to the free Courſe which the Matter has thro' the Pores of the Skin: With this alſo agrees the conſtant Obſervation, that People of coarſe grain'd *Skins*, in whom the Pores are largeſt, are moſt favourably treat-

ed by this Diſtemper, which likewiſe conſtantly leaves fine *Skins* much coarſer than it found them.

What has been ſaid of the *Small Pox*, will ſuffice to ſolve the *Phænomena* of the *Meaſles*, *Scarlet-Fever*, and *Eryſipelatous Inflammations*, which differ only in Degree or Occaſion. This Courſe and Effect of theſe ſalt *ſerous Humours*, are likewiſe applicable to the *Itch* and other *Cutaneous* Eruptions, which we not deſigning a formal Treatiſe of here, leave others to apply as they ſee occaſion, which it will be eaſie for them to do.

Of the Membrana Adipoſa *and its Fat, and of the* Carnoſa *ſeu* Muſculoſa. *By the ſame Author.*

IMmediately under the *Skin* lies the *Fat*, which is call'd in Latin *Pinguedo*, and in Engliſh by the general Name of *Fat*, in Contradiſtinction to the *Adeps*, *Scævum* or *Suet* and Leaf, which are found in the Cavities of the *Abdomen*, and differ ſomewhat from each other in Conſiſtence. This *Fat* is found all over the Body Co-extended to the Skin itſelf, except on the *Forehead*, *Eyelids*, *Penis* and *Scrotum*. In emaciated Bodies, inſtead of this *Fat* we find a ſort of flaccid tranſparent Membrane, which is nothing elſe but the *Loculi* or *Cellulæ Adipoſæ*, in which the *Fat* of Bodies in good habit is contain'd, but which in theſe is waſted. It is in Subſtance a groſs whitiſh Oil, and is indeed nothing but the Oily part of the Aliment, ſeparated from the *Arterial Blood* by the *Adipoſe Glands*, and carry'd by peculiar Glands to the *Membranous Cells*, from whence it is tranſmitted to the Blood again by the *Veins*.

The *Fat* of both Kinds ſerves as a Natural Balſam to preſerve the Body, and by mixing with and enveloping the *Salts* wherewith the *Blood* and *Serum* are highly ſaturated, keeps them from fretting and corroding the Parts thro' which they paſs. It is thought likewiſe, not without great probability, to make a conſiderable part of the Nouriſhment of our Bodies; and accordingly we find that the groſſeſt, fatteſt Perſons falling into an *Atrophy*, do in proceſs of Time loſe all their *Fat*, which is always quite expended in ſuch Caſes before the Diſeaſe becomes fatal.

As it has its great and excellent Uſes, ſo it is not without its Inconveniences likewiſe. For, corpulent Perſons that abound with it, having their Blood too much charg'd, and all their Organs too much clogg'd with it, *Senſation* is *damp'd*, and they are apt to fall into a *Drowſie Lethargick* Condition, which ſometimes ends in ſudden Death. But the Abundance of it ſeldom fails of being attended with *Inactivity* and *Somnolency*, not only from the Unweildineſs of an overgrown Body, nor from the Stuffing of the Cavities of the *Thorax* and *Abdomen* alone, which is ſometimes ſo great as to obſtruct in ſome Meaſure the Motion and Expanſion of the *Diaphragm* and *Lungs*, and ſo to produce a *Dyſpnæa*, or Difficulty of Breathing, and ſometimes an *Orthopnæa*, which ariſes from the Preſſure of the overcharg'd *Viſcera* of the *Abdomen* upon the *Diaphragm*: But it is probable likewiſe, that the Quantity of *Fat* or *Oily* Particles being return'd into the Blood, and engaging the more ſubtle active Parts, hinder thoſe Secretions from being made in the Brain in that Quantity, which is neceſſary to a vigorous Animal Action.

The *Membrana Adipoſa*, if there be really any ſuch *Membrane*, and that it be not rather the *exterior Membrane* of the *Carnoſa* or *Muſculorum Communis*, which moſt *Anatomiſts* now agree it to be, is ſuppos'd to be the *Baſis* of the *Fat*, to which the Cells wherein it is contain'd are fix'd.

Next under the *Fat* lies the *Panniculus Carnoſus*, which conſiſts of a double *Membrane*, the upper of which makes the *Membrana Adipoſa* before ſpoken of; the under, which is likewiſe call'd *Membrana Muſculorum Communis* or *Muſculoſa*, is in ſome Places interwoven with pretty thick *Muſcular* Fibres, which are ſuppos'd to contract and corrugate the *Skin*: Tho' this Action of it is viſible no where in a humane Body, except on the *Forehead*, or in ſome of the whole Scalp. It is ſpread all over the Body, but very unequally in Point of Thickneſs, and has its *Arteries*, *Veins* and *Nerves*, from thoſe of the ſubjacent Parts.

The particular Uſe of it is to ſupport, nd be, as it were, a *Baſis* to the *Globules* of at. It ſerves in General as all other *Mem-anes* do, to wrap, defend, and connect the Parts together. Its different Names taken either from the Structure, or the Site, have occaſion'd ſome to multiply it, tho thro' miſtake only.

The Myology or Doctrine of the Muſcles. Taken out of Monſieur de St. Hilaire, *his Anatomy of the Humane Body.*

Of Muſcles in general.

A Muſcle has obtain'd its Denomination from its Reſemblance to a flea'd Mouſe; which has (not unlike a Rat) a ſmall Tail, and a big and bloated Belly. By the *Latins* it is called *Laterius*, from its Figure alſo, which in ſome meaſure is like that of a *Lizard*.

A Muſcle is an Organick Part, being the Inſtrument of voluntary Motion; its Contexture is of Fibres, intermix'd with Arteries, Veins, Lymphatick Veſſels, and a Membrane wherewith they are inveſted.

The Order or *Series* of Muſcles (according to *Steno*) is different in the Muſcles, and adapted to the various Motions for which they are deſigned. The Extremities of all theſe fleſhy Fibres are nervous, being thoſe that are commonly ſtiled the *Head* and the *Tail* of the Muſcles, which form the Tendons. The *Belly* or *Middle-part* of each Muſcle is fleſhy and riſing, each Fibre making at leaſt Three ſtreight unequal Lines, which make *alternate Angles*: Theſe Angles are ſo called, becauſe the Lines that make them run betwixt Two Parallels.

Each Muſcle is provided alſo with ſeveral lays of tranſverſe and ſtreight Fibres. All theſe of the ſame Order are placed upon one and the ſame Plan, and do form a *Parallelogram* or *Rhomboides*, the two oppoſite *Latera* or Sides of which are parallel, and from acute *Angles*, and the Two other Sides make two oppoſite Tendons, without the Parallelogram, or the Oblong Square.

The whole Plan, or Surface of the *Rhomboides*, is compoſed of parallel Fibres by the Reaſon of which Tendons are form'd, ſo that there are the ſame Number of Nervous Fibres in the Tendon, as there is in the Belly of the Muſcle. All the internal Fibres of the Tendon are ſhorter than the external.

In each Area or Series of the Fibres are to be obſerved Three different Sorts of Figures: The Firſt and Three are always oppoſite, as that in the Muſcle makes a *Rhomboides*.

Several Lays of parallel Fibres, which form'd a Dimenſion of Thickneſs, make what we call a *Parallelepipedum* and compoſe a ſimple Muſcle, becauſe a compounded Muſcle is a Compoſition of ſeveral *Parallelepipedum's*.

All the Force of the Muſcle proceeds from their Fibres and Tendinous Filaments, as is ſufficiently apparent in thoſe Bodies that, by a long lingring Fever or a Conſumption, are reduced to the higheſt Degree of Leanneſs; for in theſe wee ſee the Motion to continue, notwithſtanding that all the fleſhy Parts are quite conſumed, and according to an Experiment of *Steno*, the *Muſculus gracilis internus* will bear Fifty Pounds Weight without breaking. At the ſame Time, we muſt not imagine, that the different *Series* or Diſpoſition of the Fibres of the Muſcles are always adapted to the various Motions of the Part in a different manner.

There are certain Muſcles, which tho' they have but one Motion, yet the Diſpoſition of their Fibres is ſuch as to form two Muſcles, as may be obſerved in the *Muſculus Semi-nervoſus.* Some Muſcles there are, in which the Fibres run in a ſtreight Line lengthways, in others they take a ſpiral Courſe, and others there are which have a double *Series* of them, ariſing from both the Sides of a Tendon like the Beards of a Quill.

All the Fleſhy Fibres of the Belly or *Venter* of a Muſcle, are not ſo cloſe or compact as thoſe of the Tendon. The Motion of the Muſcles does depend on the Contraction or ſhortning of the Fleſhy Fibres, which draw or pull in the Tendons: Theſe Tendons are ſometimes double, and ſometimes threefold, (as we may obſerve in the Tendons of the Muſcles, called the *Biceps* and the *Triceps*,) as well as their fleſhy Part, which is ſometimes double, as in the *Muſculus Digaſtricus.*

The Nerves enter the Muſcles indifferently, as well at their Extremities as their Bellies, after having communicated many of their Branches to their proper Membranes.

Laſtly, The Muſcles are ſerviceable to all the various Motions of our Members; ſome being framed and adapted to Flexion, others for Extenſion; ſome for raiſing, others for lowering; ſome for bringing the Parts together, others for drawing them at a greater Diſtance; ſome for opening, ſome for ſhutting or cloſing, and others for compreſſing.

When any violent Motion is to be made, the Muſcles are provided with very conſiderable Tendons; as on the other Hand, theſe Muſcles that are deſigned only for opening and cloſing together, as the *Sphincters*, are without them.

'Tis further to be obſerved, that all ſuch Muſcles as are employed in the ſame Motion, are ſtiled *Conveyers*, as thoſe which produce a contrary or oppoſite Motion are called *Antagoniſts.*

Concerning the Number of the Muſcles, it is hard to be determined, conſidering it is augmented almoſt every Day, ſome Anatomiſts have computed no leſs than Five hundred twenty nine of them.

Each Muſcle has Two Sorts of Motions, *viz.* that of *Contraction* and *Extenſion.* In the Firſt it is ſhortned, and in the Latter it it is lengthned; from thence, like a Spring, all the various Motions of the Body have their Riſe. Unto theſe they add a Third, call'd the *Tonick Motion*, being that Motion when divers Muſcles act in concert, and keep a certain Part firm and ſteady without moving it any way. Thus it happens when the four *Muſculi recti* of the Eye remain fix'd and unmoved upon one Place, or when a Man ſtands erect; for then at that Time he does not actually move, yet the Muſcles that keep him in an erect ſtreight Poſture are in Action at the ſame Time.

The Motions are diſtinguiſhed into *Simple*, or *Compound*; thus theſe Motions that are made upwards or downwards, and backwards, either to the Right or Left, are called *Simple*, becauſe they are made by one ſort of Muſcle only; but when divers Muſcles act together, and ſucceſſively, it is called a *Compound* Motion, as when we move the Arm quite round.

When a Muſcle is in Action it ſwells, becauſe it ſhortens itſelf, and the Thickneſs, which is the Effect of this Swelling, is always in its Belly, and appears on the outſide, unleſs it be in the Muſcles of the *Epigaſtrium*, theſe being deſtitute of Bones to reſt upon.

Every Muſcle takes its Riſe from a more firm Part than that where it has its Inſertion, and the Part to be moved is always that where it has its Termination; ſo that by a natural Conſequence upon the Contraction of a Muſcle it is ſhortned, and conſequently one of the Two Parts unto which its Extremities are faſtned muſt be moved, and this is always the ſame into which it is inſerted.

So that it is agreed on all Hands, that the Muſcles ſerve to move all the Parts of our Body whenever we think fit; and tho' it is hard to conceive in what Manner it is accompliſhed, yet our modern moſt ingenious Anatomiſts have given us an Idea of it, founded upon the Rules of Mechaniſm.

The very Sight of a Muſcle, ſay they, gives us to know that it is capable of Motion, and that it is always in a Condition

to

to it; but that at the ſame Time there muſt be ſome Cauſe that puts it in Motion: That indeed it is beyond all Diſpute, that we muſt look for this Cauſe in the Brain, becauſe in that very Inſtant that the Will has determined to bend the Wriſt, the Muſcles play and the Wriſt is bended: And this they ſay is accompliſhed thus:

The Blood, which is without Intermiſſion thrown into the Body of the Muſcle by the Artery, is always ready to be rarefy'd in order to ſwell the Muſcle, but at the ſame Time is not in a Condition to do it of its own Accord; ſo that this Rarefaction muſt be accompliſhed by its intermixture with the Animal Juice, which by the Nerve is convey'd to the Muſcle, whereby its Fibres being put at a Diſtance from one another, they are ſhorten'd; and thus enſues the Motion of that Part which is faſtned to the *Tail* of the Muſcle.

As this Influx of the Animal Juice to the Muſcles is never made but when we pleaſe, ſo the Motion depends on our Will. Thus if our Will is determined to let the Arm be at reſt, it reſts accordingly; or it would have the Foot to move, it moves in an inſtant.

Nevertheleſs, it is not to be imagined that this Animal Juice is carry'd from the Brain into the Muſcles at that very inſtant that the Soul wills the Motion; becauſe the Motion enſues ſo immediately upon the Determination of the Will, that it is impoſſible the Juice ſhould go ſo far in an inſtant: But you muſt conſider the Nerves are as ſo many Channels or Conduits fill'd with the Animal Juice, and conſequently ready at all Times to pour it out at their Extremities into the Muſcles where they have their Terminations; ſo that whenever the Muſcle is determined to move, then happens a gentle Compreſſion of the Fibres of the Brain upon the Extremity of the Nerve. By this Compreſſion, the *Animal Juice* wherewith the Nerve is fill'd is puſhed forward, and forced to paſs out of the other Extremity of the Nerve that has its Termination in the Muſcle, when being mixed with the Blood, that it is never wanting, then enſues an Ebullition which cauſes an Intumeſcency or Swelling.

For the illuſtrating of this Opinion, they give us a Compariſon of a Ciſtern, which being to furniſh ſeveral Water-works when they are to play with Water, is always placed in the higheſt Place of the Garden, and ſeveral Pipes that have their Riſe from it, and runs to all the Fountains; when the Gardiner has a Mind to make any one of theſe Fountains play, he opens the Cock of its Pipe, and at that very Inſtant it begins to play, notwithſtanding it is ſometimes Five hundred Paces diſtant from the head Ciſtern. In the ſame manner the Brain ſupplies the Function of the Ciſtern, the Nerves are the Pipes, the Fountains are in lieu of the Muſcles, and the Gardiner here repreſents the Will, who at his own Pleaſure puts all the Muſcles in Motion.

If we duly conſider what happens in theſe Motions, every Thing will be found to concur to confirm this Opinion. When a Man is without Action or Motion, he is not ſo warm or hot as when he is in Exerciſe or Walking, becauſe the Motion being kept up by many reiterated Ebullitions, it encreaſes the Heat and Circulation of the Blood, and renders it more active than whilſt he is at Repoſe; And if you lay your Hand upon the Heart of a Perſon who has run a Courſe, you will find his Heart beat much faſter than it uſed to do at other Times; becauſe, the Blood being hurried with much Precipitation thro' the Muſcles, and having cauſed a frequent Intumeſcency in them, by its being intermingled with the Animal Juice, it is carried with more Rapidity than ordinary to the Heart.

Tho' we have compared the Brain to a Baſon or Ciſtern, it is nevertheleſs not to be imagined, that it is ſufficiently capacious to contain ſuch a Quantity of the *Animal Juice* as is requiſite to anſwer all the Motions of a Traveller; that is, to walk on Foot all day long. No, that Share of the Animal Spirits which has produced the firſt Motions, after its being intermingled with the Blood, is carried back by its Circulation to the Brain, where being ſeparated from the Blood, it is adapted to, and employed again upon freſh Motions; whence it is evident, that the Animal Juice circulates as well as the Blood, and that conſequently what Share of it is diſſipated by the Exerciſe, is repaired by the Aliments we feed upon;

upon; hence alſo it is evident, that ſuch Perſons as are employed in hard and laborious Work, do require a greater Quantity of Food, and to take them oftner than other People. Our Body, ſays a certain modern Author, is not unlike unto an Alembic; there the natural Heat is the Fire, the Heart is the Fire-Place, the Mouth and the Noſtrils are like the Vent-holes which govern the Degrees of this Fire; the Lungs are the Bellows which blow it up, as the Niter which paſſes along with the Air thro' the Lungs, and the Sulphureous Particles contained within the Aliments we feed upon are the Matter or the Fuel which furniſhes a conſtant Supply to this Fire. Our Head is the Head of the Alembic, the Matter to be diſtilled in it is the Blood, from whence the Spirit is to be drawn in the ſame manner as it is done from Wine and other diſtilled Liquors.

The Fire which is lodged in the Heart volatiliſing the Blood, or rather ſeparating the Volatile Salt which is contained in it, does raiſe or ſublimate it up into the Head, by the Way of the aſcending Trunk of the *Aorta*, by the *Arteria Carotides*, by the *Vertebrales*, and by the Branches which are emitted by them.

But, as the Volatile Part of the Blood has carried along with it in its Sublimation abundance of Phlegmatick and Sulphureous Particles, which muſt be ſeparated from it before it can produce a pure Spirit, it is cleanſed by filtraction thro' the cineritious Portion of the Brains, as thro' a *Manica Hippocratis*, or like thro' a thick Spunge, by the Help of which we do rectify the Spirit of Wine to its higheſt Degree.

The Nerves are ſo many *Roſtra* of the Alembic, thro' which the diſtilled Liquor, *i. e.* the Animal Spirit, is emitted into ſo many Receivers or Recipients, which are all thoſe Parts which are animated by it.

This Alembic is ſo excellent a Contrivance, that the Spirit, after having carried along with it part of its Phlegm, not only diſcharges itſelf of it in its Head, but alſo expels it by a peculiar Roſtrum, *viz.* by the *Infundibulum* or *Tunnel*, whither this Phlegm is carried thro' many ſecret Paſſages in the Subſtance of the Brain; for in its cineritious Part, three different Sorts of Matters are ſeparated, *viz.* the Spirit, (which can't be any thing elſe but a Volatile Salt diſſected in a ſmall Quantity of this Phlegm the Sulphur, and the Phlegm.

The firſt and the laſt of theſe Subſtances ſtay behind in the Brain, becauſe here they meet with proper Apertures to receive them; but the ſulphureous Part is forced to return back to the Heart, becauſe its rarefy'd Particles will not afford it a Paſſage thro' the minute five-line Holes of the Brain, yet ſo as to reconvey along with it thither ſome part of the Phlegm as well as of the Spirit, which being entangled betwixt, its oleaginous and ſulphureous Particles could not diſcharge themſelves from it. The Blood thus reconvey'd to the Heart being enlivened with freſh Heat, fermented and ſubtiliſed again, it is ſublimated afreſh, ſo that its moſt ſubtile Parts may now diſentangle themſelves from their more groſs Parts.

Some are of Opinion, that the Liquid part of our Blood is of ſuch a Nature or Diſpoſition, that by its often reiterated Sublimations in our Body (which in this Caſe we may well compare to a certain Veſſel uſed by the Chymiſts, and known among them by the Name of a Circulatory) its repeated Rectifications and Cohabations (as we may call it according to the Chymical Terms) it would be altogether volatiliz'd or turn'd into Spirits, as we ſee it happen in other Chymical Liquors, were it not that by our daily Aliments, and their Intermixture with it, this exceſſive Volatilization and Rectification is prevented.

When we tell you, that the Spirit and Phlegm are filtrated in the Brain, you muſt not imagine as if there were no more than one ſingle Fibre made for that Purpoſe: No, there are certain Conduits here which receive the Spirit, convey it into the *Corpus Calloſum*, into the *Corpus Caneloſum*, and thence to the *Medulla Oblongata*, and ſo at laſt into the Nerves. Other Channels there are which are deſigned for the Reception of the Phlegm which convey it to the Ventricles; from thence it is ſent further thro' the *Infundibulum* to the *pituitary Gland*.

But after all that has been ſaid, it is not to be imagined that this ſeparation ſhould be performed ſo exactly, but that the *Filtra* of the Spirits does not alſo receive and admit along with them Part of the ſubtile

legm, or of the moſt refined Volatile t, as alſo of the pureſt *Sulphur*: Theſe ur different Sorts of Subſtances being u- ed together, do probably produce what call the Nervous Juice, which ſerves for Vehicle, or rather as a Check or Impedi- nt to the Animal Spirits, to prevent their quick Evaporation.

Neither is to be imagined, that the Re- neration of this Animal Spirit is accom- ſhed barely by way of Filtration; it is more an probable, that ſo ſoon as the Blood is rown into the cineritious Subſtance of the Brain, it begins to ferment afreſh by eans of ſome *Sal-Armoniac*-like or other olatile ſaline Particles wherewith it a- ounds.

The Particles of theſe Salts, and thoſe of e Blood, ruſhing with Violence in this ermentation againſt each other, it muſt of eceſſity happen, that they break and reduce e another into very minute Parts; and is being more ſubtilized than before, are hereby rendred more proper, and ſuited for eir enſuing Filtration thro' the ſeveral oper Conduits of the Brain.

Or elſe it is rational to ſuppoſe, that the *Sal Armoniac* being of a very Volatile Na- re itſelf, is capable of ſubtilizing and vo- atilizing the Blood, and conſequently to nder it more proper and fit for its Filtra- ion thro' the Conduits of the Brain.

Concerning the Muſcular Motion, Dr. *layow* has given us a certain Syſtem, ac- rding to which the Membranous Fibres nning a-croſs the carneous Fibres, and hich gather them together, accompliſh the hole Motion of the Muſcle. He ſays, at the nitroaereous Corpuſcles, diſperſed ro' every part of the Organ, are by the preſſion of ſome Object, the Determina- n of the Will ſet in a Flame by the eat of the Blood joined to the Influx of e Animal Spirits thro' the Nerves; upon which, ſays he, theſe Fibres muſt of neceſſity twiſt and furl themſelves like as we ſee the La bels of Parchments when expoſed to the Flame of a Can- e; and thus by con tracting themſelves, oduce div ers Folds in the carneous Fibres, the Shortning of which, the Contraction of the Muſcle does conſiſt. And no ſooner does this Efferveſcency ceaſe, but the Parts re- aſſume their natural Poſture and Poſition. But in what manner the ſedate and mode- rate Motions which we are capable can be reconciled with this neceſſary Violence and Quickneſs of this ſuppoſed Efferveſcency, I will leave others to determine.

Mr. *Borelli* has drawn an ample Mathema- tical Scheme concerning the Motion of the Muſcles; his Suppoſitions are founded chiefly upon a certain Machine call'd *Zig-Zag*, or the Graſhopper. This Engine conſiſts of di- vers ſmall Pieces of Wood, two and two, which croſs one another in the Middle, and each of thoſe are correſpondent with the other two by their Extremities, ſo that all of them being at Liberty to turn upon the Pegs which join them, they contract the Engine, by enlarging the *Quadrilaterum's* that reſult from their Conjunction. *Bo- relli*, as I ſaid before, relying and adapting his muſcular Motions to the Properties of this Machine or Inſtrument, conceives that the inſenſible Parts of the moving muſcu- lar Fibres may have a Structure of the like Nature, and that ſome ſpirituous Humour being forced violently or thrown precipi- tantly into thoſe little Interſtices or Caverns, which are of the Figure of a Lozenge, widens the Diſtance of their *Parietes*, and thus rendring them of a ſquare Figure, produces that Intumeſcency in which the Action of the Muſcle conſiſts. But this *Hypotheſis*, as ingenious as it ſeems to be at firſt Sight, will not bear the Teſt, being founded upon nothing but imaginary Sup- poſitions, becauſe neither Diſſections, nor the ſtricteſt Enquiries made by the help of the moſt exact Microſcopes, have hitherto given us the leaſt Proſpect of diſcovering any ſuch like Structure of the Fibres of the Muſcles.

The *Hypotheſis* given us by Mr. *Bonet* in the fourth Journal of the *Progres de la Me- decine*, for the Year 1696, ſeems to be much more natural and plain, becauſe all his Suppoſitions on the Organs are founded up- on ſuch Things as are manifeſt and obvious to our Senſes; *viz.* Fibres of divers Sorts, provided with an Elaſticity or Reſort, bent, rarefy'd, and at all Times kept ready for Motion by the fluid Humours, which

Taken out of Di- s *eighth Demon- ration*, p. 380. ſeq.

with-

without Intermiſſion penetrate thro' them; and the Head of the Vapours that inceſſantly are thrown off thro' the Pores of the Veſſels into the moſt minute Interſtices of the Parts.

He repreſents to us, that a gentle Emotion cauſed by the Ebullition of a few Drops of a Humour, or by the Impreſſion of any ſharp pointed Particle, is capable of producing a moſt vigorous Contraction in a Muſcle, for the Fibre which is immediately put in Motion or ſhaken by this Emotion meeting with another adjacent Fibre in its infinite Vibrations, occaſioned by its elaſtick Redound or Reſort, will communicate to them the ſame Agitation as its own, eſpecially if they are of a homegeneous Nature and in Conſert, as all the fleſhy Fibres of one and the ſame Muſcle appear to be, from the Equality of their Magnitude, Tenſion Figure and Conſiſtency.

Theſe Fibres, ſays he, muſt of neceſſity give a Shock to the next adjacent, unto which they are knit in ſome Place or other; ſo that in this manner, the Motion being convey'd from one to another thro' the whole Body of the Muſcle, and that in an inſtant, the whole Organ immediately contracts it ſelf with a great Force, by pulling in its moſt moveable Extremity.

Thus we ſee ſeveral Strings placed inUniſon upon an Inſtrument of Muſick tremble as ſoon as one of them is touched with the Bow, and endeavouring to recede from a ſtrait Line, to pull violently the Pins that faſten them.

Thus the Naturaliſts explain the *Phænomenon* of a ſmall Noiſe raiſed in a Weed, by the mutual Colliſion of two hard Bodies, or by a low Voice. For here the Sound is received in an Infinity of Places, by vertue of the Motion it imparts to every Branch and Leaf of the Trees, which like ſo many Clappers repeating the Sound, or modifying the Air which is toſſed among them, do thereby multiply the Sound on all Sides.

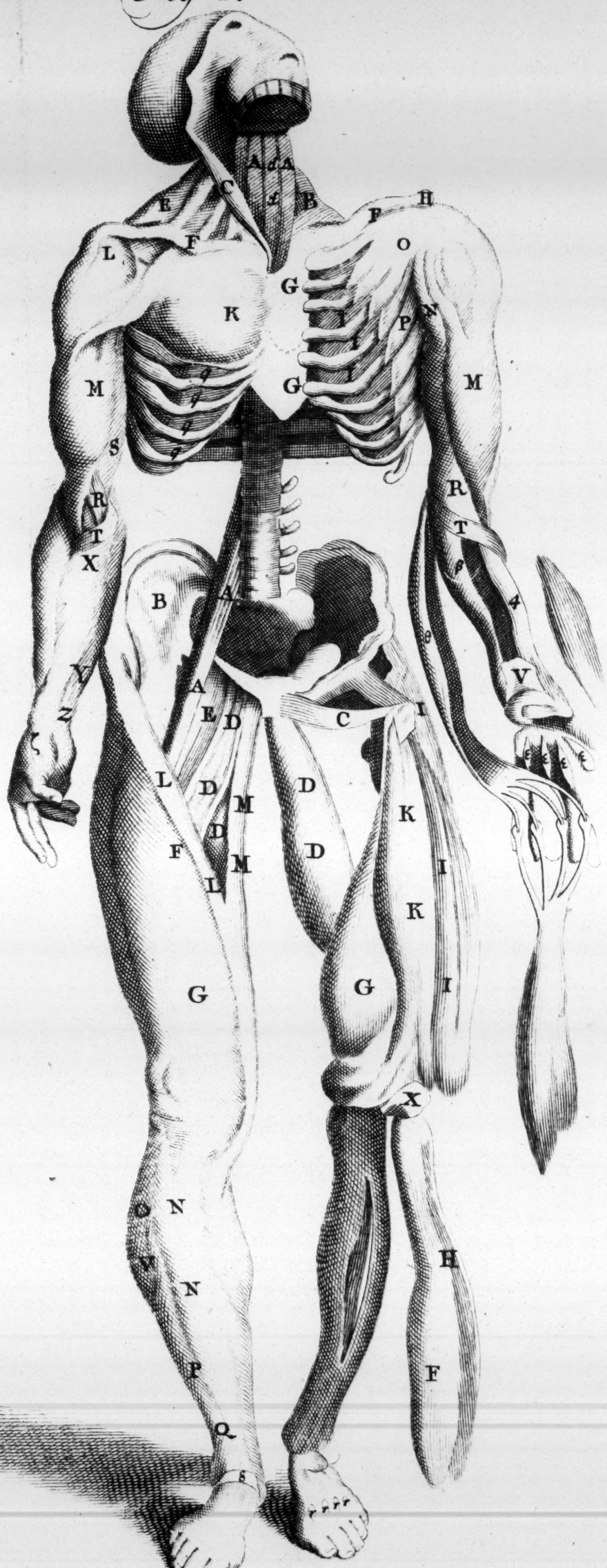
The ſame Reaſon will take Place in the Agitation of the leaſt Particle of each Muſcle, which may be fitly conſidered as a Forreſt of elaſtick Reſorts or Springs, provided with a ſurpriſing Fineneſs and Agility; ſo that the leaſt Particle can't ſo much as quake, but all the Springs and elaſtick Parts of t intervening Air unbend at the ſame Ti and produce a Tumefaction in the Mu with vigorous Efforts, by reaſon that th various tremulous Motions require mo Space than what they ſtood in need of b fore in their State of Repoſe or Unactivi or in the Time of an ordinary or obſcu and unperceivable Motion. 'Tis true, t Fibres of a Muſcle being placed compact wit in a Membrane, are not ſuſceptible of ſuc Commotions as to cauſe a conſidera Contraction; neither was there any Occaſi for it, ſince Nature ſtood in need only of firm and quick Contraction, and that wit in a narrow Space. For the Muſcles ha ving their Inſertions near the Joints for th greater Conveniency of their Motions, th Force of theſe Organs was calculated t ſurmount ſuch Obſtacles as were to act up on the ſame Leaver with it, tho' at a muc greater Diſtance from the Center of the re and conſequently with the greater Adva tage, according to the Rules of Mech niſm.

If a very ſmall Imitation is capable throwing a Muſcle into moſt violent Con tractions, it may by way of Equivalent b overcome, even in its ſtrongeſt Efforts, by very weak Cauſe.

Thus we ſee in a great Bell, all the Pa ſhake and hum together, with a Force ſu paſſing that which put it in Motion ma Millions of Times, and yet its Sound check'd, and ceaſes as ſoon as we apply o Finger only, or any pliable Body. In th ſame manner all the tremulous Motions o the Filaments of a Muſcle, which mutual ſupport and fortify one anothers Agitatio will ſoon be ſuſpended, either by bei drawn a contrary Way by the Contractio of the Antagoniſt Muſcle, or elſe by th Afflux of ſome Humour that either l bends or ſtiffens ſome of them, or by a no Preſſure that breaks their Conſort.

That *Æquilibrium* which the Muſcles u ſually are in when they are unactive, or a State of Reſt, or which at leaſt they ma eaſily recover, makes us ſenſible beyond Diſpute, that we have a Power of movi our Members at Pleaſure, when an unpe ceivable Motion happens, that of itſelf di poſes the Muſcle to contract itſelf, by ex tin

Fig: I.



The Fore part from S^t Hillaire

Fig: II.

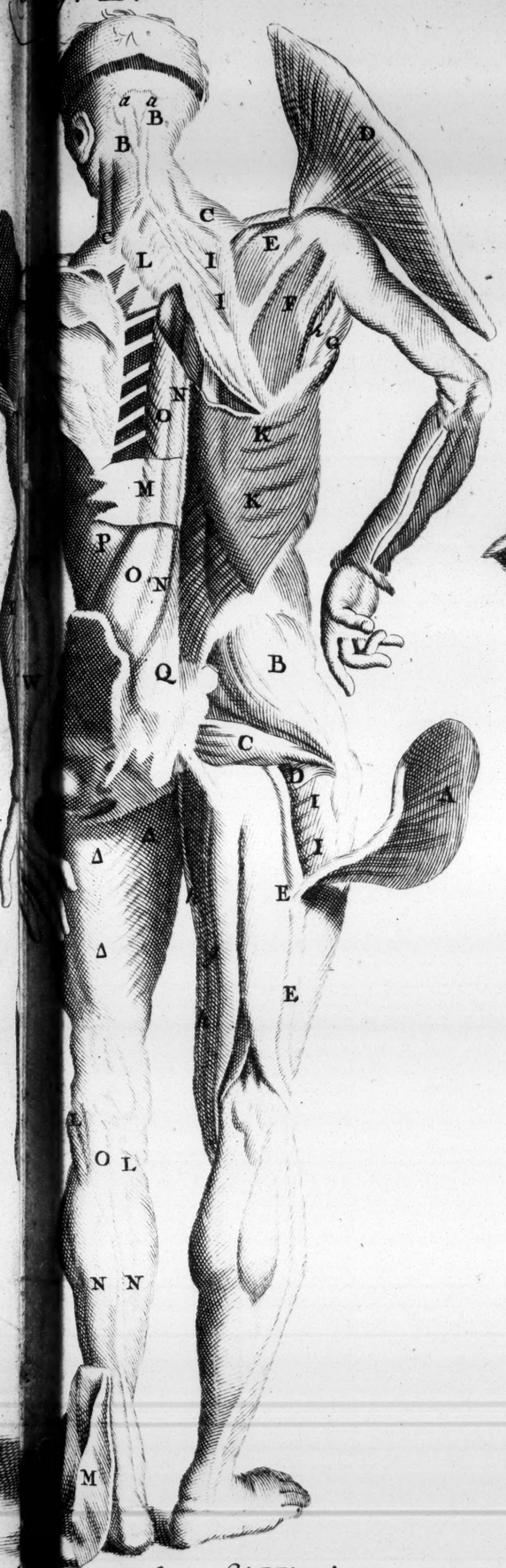


Fig: III.

Fig: IV.

Fig: V.

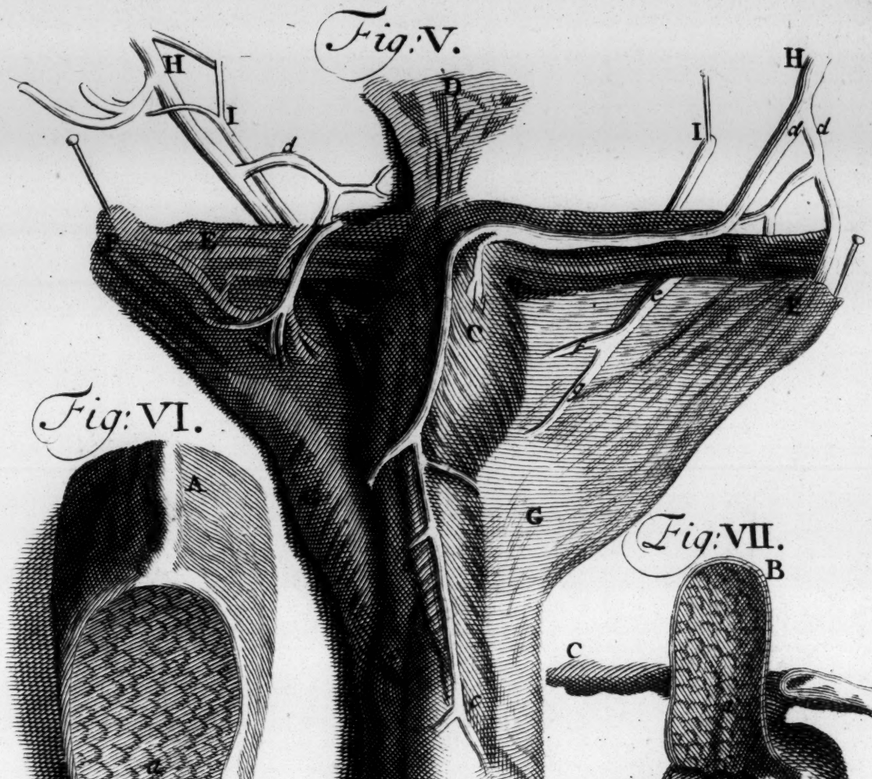


Fig: VI.

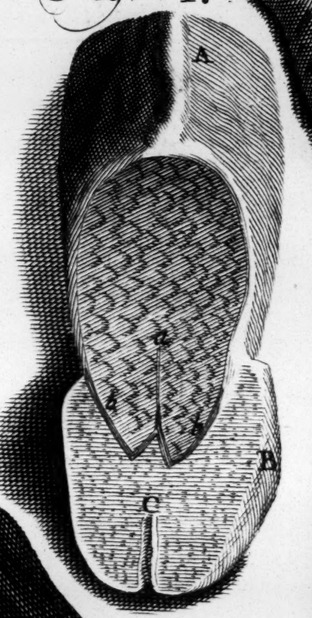


Fig: VII.

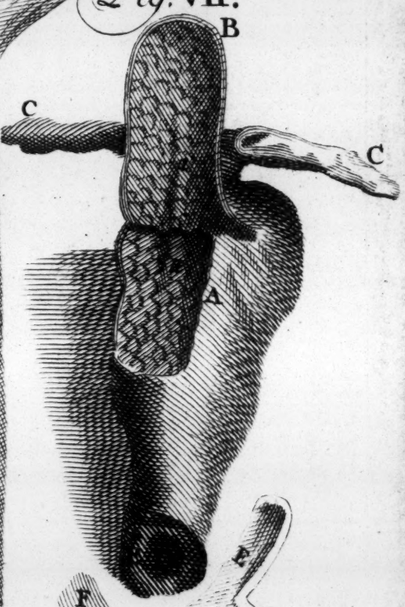


Fig: VIII.

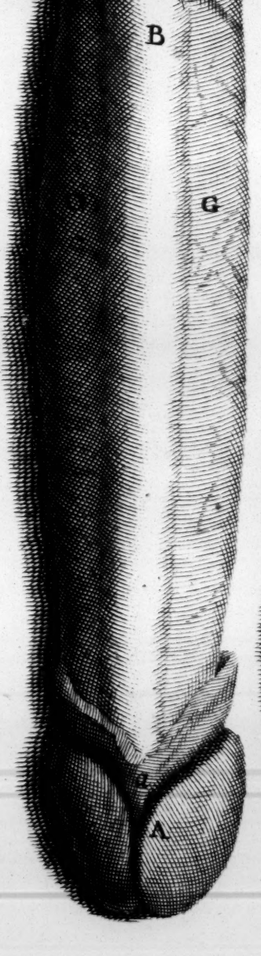


Fig: IX

Two Figures from Mr Cowper. & others.

d part from St. Hillaire

Satisfaction in the Soul, we voluntanſent to it, which is what we call a ary Action.

ſeeing it is more probable, that in to move the Muſcles, the Soul is imely united to their *Tibia Motrices* than Origin of the Nerves which lies at Diſtance; this Syſtem diſcovers and s all the Chymerical Motions of the al Spirits, the nervous Juice, and all has been put in their Room, ſuch as impreſs'd Qualities, and the tremulous Motion communicated from the Brain to all the Organs of Motion, by the Mediation of the Nerves; and attributes to the Nerves three principal Uſes: *Firſt*, By Vertue of their Firmneſs they keep all the Fibres of the Organs (to which they are diſtributed) in a Condition to perform their Office; *Secondly*, By Vertue of their Pliableneſs, Elaſticity and Turbility, to fortify and enliven the Action of the Cauſes of Motion in theſe Parts. *Thirdly*, In diſperſing thro' the other Parts, to which they are knit by ſome Fibres, the Impreſſion they received in the former.

The ſame Author, by a juſt Compariſon of a Muſcle to a *Pendulum*, draws divers rational Conſequences from this his *Hypotheſis*, ſuch as the continued Pulſations of the Heart, the alternative Contractions of the Organs of Reſpiration. For, ſays he, whether the Motion of the Humours, or the Agitation of the Vapours, or the Impreſſion of Objects, *&c.* if any of theſe Cauſes continue very near the ſame, theſe Contractions will remain regular; but in caſe the inward Heat be either conſiderably increaſed or diminiſhed, if any remarkable Alteration happens in the ordinary Irritation of the Matter that touches theſe Muſcles, their Motion will prove alſo irregular, and be either ſtronger or weaker than they are in their natural State. He makes the Periods of Fevers, and ſeveral other Diſeaſes, likewiſe Corollaries of this his Syſtem, *&c.*

The Explication of the Figure, repreſenting all the Muſcles of the Fore-Part of the Trunk of the Body. Out of St. Hilaire.

A, A. The *Muſculi longi Colli.*
B. The *Muſculus Scalenus.*
C. The *Muſculus Scalenus Flexor Capitis.*
D, D. The *Vertebræ* of the Neck.
E. The *Levator Scapulæ.*
F, F. The *Claviculæ.*
G, G. The *Sternum*, or Breaſt-bone.
H. The *Acromium* of the *Humerus.*
i, i. The *Muſculus Subclavius.*
K. The *Pectoralis.*
L. The *Muſculus Deltoides.*
M, M. The *Muſculus Biceps.*
N. The *Perforatus.*
O. The *Serratus minor.*
P, P. The *Serratus major.*
q, q, q, q. The *Muſculi Intercoſtales.*
R, R, R, R. The *Muſculus Brachiæus* in each Arm, together with part of the *Biceps.*
S, S. The *Extenſor Cubiti*, called the *Longus.*
T, T. The *Pronator rotundus Radii.*
V. The four *Pronatores* of the *Radius.*
X. The *Flexor primus externus Carpi.*
Y. The *Muſculus Palmaris.*
Z. The *Muſculus flexor ſecundus Carpi.*
4. The Bone of the *Radius.*
ε. The Bone of the *Cubitus* or *Ulna.*
ϑ. The Ligament which conjoins the *Cubitus* and the *Radius.*
. The *Muſculus flexor Digitorum*, ſirnamed the *Sublimis*, and the *Perforatus.*
θ. The *Profundus* conjoin'd with the *Perforatus.*
ε, ε, ε. The *Muſculi Lumbricales.*
ζ, ζ, ζ. The *Muſculus flexor Pollicis.*
λ, λ. The *Muſculi adductores Pollicis.*

The following Characters denote the inferior and anterior Muſcles, from the Region of the Loins, to the very Extremities of the Feet.

A. The *Muſculus Pſoas* ſive *Lumbaris.*
B. The *Muſculus Iliacus.*
C. The *Obturator internus.*
D, D, D, D. The *Muſculus Triceps.*

E. The *Lividus.*

F, F. The *Rectus inſitu*, which hangs down on the right Thigh.

G, G. The *Vaſtus internus.*

H. The *Vaſtus externus*, which hangs down towards the right Thigh.

I, I. The *Membranoſus*, or the *Faſcialata.*

K, K. The *Muſculus Crurus.*

L, L. The *Muſculus Longus.* M, M. The *Gracilis.*

N, N. The *Tibialis anticus.*

O. The *Muſculus Biceps Peronæus.*

P, P. The four *Muſculi Extenſores* of t four leſſer Toes.

Q. The *Muſculus Extenſor* of the gr Toe.

R. The *Lumbricales.*

r, r, r, r. The *Muſculi Interoſſei.*

S. The tranſverſal Ligament of the Foo

T. The *Tibia.*

V. The *Perone.* X. The *Rotula* or Knee-p

Of the Muſcles of the Forehead.

THE Skin on the Forehead and the Eyebrows are moved upwards and downwards by the Means of four Muſcles, *viz.* two *Frontales*, and as many *Occipitales*, one on each Side.

The *Muſculi Frontales* ariſe from the ſuperior Part of the Orbit, and the Root of the Noſe, and aſcending above the wrinkled Part of the Skin of the Forehead, have their Inſertions into the *Aponeuroſis* of the *Occipitales.* Their Uſe is to draw downwards the Skin of the Forehead, as well as the Eyebrows.

The *Muſculi Occipitales* have their Riſe on the hind Part of the *Os Occipitis* above the Inſertion of the Muſcles of the Head, and aſcending to the *Sinciput*, have their Implantations at the *Aponeuroſis* of the *Frontales.* Their Uſe is to draw the Skin of the Head and the Forehead upwards.

Of the Muſcles of the Eyelids.

THE Eyelids are opened and cloſed by the Means of two Muſcles.

The Firſt, called the *Orbicularis Palpebrarum*, has its Origination at the ſuperior Eyelid, and its Inſertion into the leſſer *Canthus* of the Eye: Its Uſe is to ſhut the Eyelids.

The Second, called the *Rectus Palpebræ Superioris*, has its Riſe at the ſuperior Part of the Bottom of the Orbit, and aſcending above the Eye, has its Termination by an *Aponeuroſis* in the *Tarſus* of the ſuperior Eyelid, that lifts up the upper Eyelid.

Of the Muſcles of the Eye.

THE Eyes have their Motion on Sides by the Means of ſix Muſcles, four ſtreight and two oblique; of wh more hereafter in the Chapter treating of Eyes.

Of the Muſcles of the Noſe.

THE Noſe is dilated and drawn to ther by four Muſcles, to wit: T on each Side.

The Firſt is called the *Pyramidalis* fr its Figure, and the *Dilatans* from its A on; it has its Origination from the tra verſe Suture which divides the upper P of the Noſe and the *Os Frontis*, and in Deſcent has its Inſertion at the *Ala* or W of the Noſe.

The Second called the *Deprimens*, has Riſe from the inferior Part of the *Os M xillare*, and its Inſertion below the N 'Tis to be obſerved, that becauſe this M cle lies much intermix'd with the Muſc of the Lips, we can eaſily ſhut the Noſt without moving the Lips at the ſa Time.

Of the Muſcles of the Lips.

THE Lips have no leſs than nine M cles, to wit: Four proper, and common.

The Firſt of the *proper* Muſcles is cal the *Inciſions*, ariſes from the hollow Part the upper Jaw below the *Os Mali*, and aſcends obliquely to the upper Lip.

Its Uſe is to draw the upper Lip u wards.

The Second called the *Triangularis*, h

Riſe at the Baſis of the Chin, and aſ-
ing obliquely where the two Lips are
oin'd together, has its Inſertion at the
r Lip.
s Uſe is to draw the upper Lip down-
ds.
e Firſt of the Muſcles common to the
ks and the Lips, is the *Zygomaticus*, being
and ſlender. Its Riſe is from the *Os*
Zygoma, and its Implantation at the Con-
tion of the two Lips.
Uſe is to draw both the Lips toge-
ther.

e Second, called the *Buccinator*, ariſes
the Gums towards the *Dentes Molares*,
is inſerted into the two Lips.
e Uſe of this Muſcle is to turn the A-
ts in the Mouth, and to thruſt them
een the Teeth for their better Maſtica-
tion.

e Fifth, called the *Sphincter*, does make
rt of the Subſtance of the Lips, and
s them together.

Of the Muſcles of the inferior Jaw.

THE Motions of the lower Jaw are performed by the Help of twelve Muſcles, to wit: Six on each Side, four of these are employed in ſhutting, and two in cloſing it.

The Firſt of thoſe that ſhut it is called *Zygotaphites*, or *Temporalis*, has its Origination from the inferior Part of the *Os Parietale*, and the concave Part of the Temple, and this paſſing under the *Zygoma*, has its Termination with a ſhort, ſtrong and nervous Tendon into the *Apophyſis Coronoides* of the *inferior Maxilla*. This Muſcle is inveſted with the *Pericranium*, and receives ſome Veins of the Jugulars, Arteries from the *Carotides*, and its Nerves from the ſixth and fifth Pair.

It is obſervable, that the Wounds of this Muſcle are moſt commonly mortal, by Reaſon of the Convulſions occaſioned here by the Nerves; and for this Reaſon it is, that when the Jaw-bone is diſlocated, you muſt endeavour its Reduction with all poſſible Speed.

Uſe is to pull the Jaw upwards.
Second, called the *Pterigoidæus interior*, from the *Proceſſus Pterigoides*, and is inſerted internally into the Angle of the lower Jaw-bone.

The Third, called the *Maſſeter*, has its Origination from the *Os Mali* and the *Zygoma*, and its Implantation at the Extremity of the Angle, and the Middle-part of the Jaw-bone.

Its Uſe is to draw the Jaw to either Side, and forwards together, with the *Pterigoidæus exterior*, has its Riſe from the *Apophyſis Pterigoides*, and its Inſertion into that Interſtice that is betwixt the *Condylus* and the *Corone* of the lower Jaw-bone.

The Fifth, and the Firſt of thoſe that open it, is the *Muſculus magnus*, which has its Origination from the ſuperior Part of the *Sternum*, the *Claviculi* and the *Acromion*, and its Implantation at the *Baſis* of the inferior Jaw-bone.

The Sixth and laſt of thoſe that opens or pulls the Jaw downwards, is the *Digaſtricus* or *Biventer*, having obtained its Denomination from its Tendon, which divides it into two Venters or Bellies. It ariſes from the *Proceſſus Styloides*, and taking its Paſſage tranſverſely over the *Stylocerato Hyoidæus*, has its Termination at the interior Part of the Chin.

Of the Muſcles belonging to the Uvula.

THE *Uvula* is provided with four Muſcles, *viz.* two on each Side, which make it move forwards and backwards in the Deglutition of the Aliments.

The Firſt, called the *Periſtaphilæus exterior*, has its Riſe from the upper Jaw-bone under the firſt *Dens Molaris*, and is inſerted with a ſlender Tendon into the Side of the *Uvula*.

The Second, called the *Periſtaphilæus interior*, ariſes from the interior *Ala* of the *Proceſſus Pterigoides*, and aſcending all along the ſaid Wing is inſerted into the *Uvula*.

Of the Muſcles of the Os Hyoides.

THE *Os Hyoides* is provided with Ten Muſcles, to wit, Five on each Side, by the Help of which it is moved together with the Tongue.

The firſt, called *Geniohyoidæus*, has its Origination from the interior Part of the Chin, and its Implantation into the Baſis of the *Os Hyoides*.

Its Uſe is to draw the *Os Hyoides* upwards.

The Second, called the *Sternohyoidæus*, ariſes from the exterior Part of the *Sternum*, and aſcending along the *Trachæa Arteria*, has its Termination at the Baſis of the *Os Hyoides*.

Its Uſe is to draw the *Os Hyoides* downwards.

The Third, called the *Mylohyoidæus*, has its Origination from the Inſide of the Jaw-Bone towards the great Teeth, and its Inſertion into the *Baſis* of the *Os Hyoides*.

Its Uſe is to pull the *Os Hyoides* obliquely upwards.

The Fourth, called the *Coracohyoidæus, ſeu Digaſtricus*, from its double *Venter* or Belly, ariſes from the *Proceſſus Coracoides* of the *Omoplata*, and is inſerted on the Hook of the *Os Hyoides*.

Its Uſe is to draw the *Os Hyoides* obliquely downwards.

The Fifth, called the *Styloceratohyoidæus*, has its Origination from the *Proceſſus Styloides*, and its Termination at the Horn of the *Os Hyoides*.

Its Uſe is to draw it Sideways.

Of the Muſcles of the Tongue.

THE Tongue has Eight Muſcles, Four on each Side, which move it every Way. Of theſe we intend to treat in the Chapter of the Parts belonging to the Mouth.

Of the Muſcles of the Pharinx.

THE Motions of the *Pharinx* are performed by the Means of Seven Muſcles.

The Firſt, and which is a ſingle Muſcle called the *Oeſophagæus*, has its Riſe from the Side of the *Cartilago Scutiformis*, and taking its Courſe behind the *Oeſophagus*, has its Inſertion on the other Side of the ſame Cartilage.

Its Uſe is to thruſt the Aliments downwards, by ſhutting the *Larynx* in the Nature of a *Sphincter*.

The Second, called the *Stylopharyngæus*, ariſes from the acute Part of the *Os Sphenoides*, and is inſerted obliquely on the Side of the *Pharynx*.

Its Uſe is to dilate the *Pharynx*, by drawing it upwards.

The Third, called the *Sphænopharingæus*, ſprings from the *Proceſſus Styliformis*, and terminates on the Sides of the *Pharynx*.

Its Uſe is to dilate and amplify the *Pharynx*.

The Fourth, called the *Cephalopharingæus*, has its Riſe from the Articulation of the Head with the firſt *Vertebra* of the Neck, and extends it ſelf to form the Membrane of the *Larynx*, which it dilates.

When we are ſwallowing the Aliments the *Muſculus Oeſophagæus* is cloſed up on the Sides, and makes the *Larynx* riſe upwards and the *Pharynx* downwards; which embracing as it were the Aliments on all Sides force them to deſcend downwards into the *Oeſophagus*, the *Cephalopharingæus* preventing at the ſame Time their aſcending again; ſo that when theſe Muſcles act together, they perform the Function of a *Sphincter* to thruſt the Aliments downwards, after they have been received into the *Pharynx*, the ſame having been dilated before by the *Sphænopharingæus* and the *Stylopharingæus*.

Of the Muſcles of the Larynx.

THE *Larynx* has no leſs than Thirteen Muſcles; to wit, Four *Common*, and Nine *Proper*; of which we ſhall ſpeak more at large in the Chapter treating of the Parts belonging to the Neck.

Of the Muſcles of the Head.

THE Motions of the Head are performed by the Means of Fourteen Muſcles, Seven on each Side, one of which draws downwards, Four upwards, and two move it in a ſemicircular Manner.

The Firſt, which draws the Head downwards, is called the *Maſtoidæus*, having Origination from the ſuperior Part of the *Sternum*, and of the middle Part of the *Clavicula*, and its Inſertion behind the *Proceſſus Maſtoides*, or *Mammillaris*.

The firſt of the *Elevatores*, or thoſe that move the Head upwards, (or rather

rds) is called the *Splenius*, being a large long Muſcle, ariſing from the Spines the Four laſt *Vertebræ* of the Neck, and the Five firſt of the Back, and having its ſertion obliquely into the *Os Occipitis*.

The Second, called the *Complexus*, has its Origination from the tranſverſe Proceſſes of the ſame *Vertebræ* as the *Splenius*, and is inſerted near the middle Part of the *Os Occipitis*.

The Third, called the *Rectus major*, ariſes from the Spine of the Second *Vertebra* of the Neck, and is inſerted into the *Os Occipitis*.

The Fourth, called the *Rectus minor*, being ſituated under the *Rectus major*, has its Origination from the firſt *Vertebra* of the Neck, and its Termination in the *Os Occipitis*.

The firſt of the Muſcles that perform the ſemicircular Motion is called the *major Obliquus*, having its Riſe from the Second *Vertebra* of the Neck, and is faſtened to the tranſverſe Production of the firſt *Vertebra*.

The Second, called the *Obliquus minor*, has its Origination from the tranſverſe Proceſs of the firſt *Vertebra* of the Neck, and is faſtened to the *Os Occipitis*.

Betwixt thoſe Muſcles that have their Poſition on the Neck, are to be obſerved Abundance of ſmall Glands, of different Figures, called the Jugular Glands, becauſe they accompany the Blood Veſſels of that Name.

Of the Muſcles of the Neck.

THE Neck has no leſs than Four Muſcles, *viz.* Two on each Side, which ſerve to depreſs and to raiſe it.

The Firſt of theſe which depreſs it is called the *Longus*, being placed under the *Oeſophagus*, and having its Riſe from the Third *Vertebra* of the Back, and its Inſertion into the fore Part of the firſt *Vertebra*.

The Second is called *Scalenus*, from its Reſemblance to a Triangle called the *Scalenum*. It ariſes from the firſt and ſecond Rib, and from the Clavicle, and terminates with its oblique Fibres at all the tranſverſe Productions of the *Vertebræ* of the Neck. It is perforated to give Paſſage to the Veins, Arteries, and Nerves.

The Firſt of the Muſcles that raiſe the Neck is called the *Tranſverſalis*, having its Origination from the tranſverſe Proceſſes of the Six *Vertebræ* of the Back, and its Implantation to the tranſverſe Productions of all the *Vertebræ* of the Neck.

The Second is called the *Spinalis*, which takes its Riſe from the Five inferior *Vertebræ* of the Neck, and from the Seven ſuperior of the Back, and is cloſely implanted to the Second *Vertebra* of the Neck.

Of the Muſcles of the Thorax *or Cheſt.*

THE *Thorax* is dilated and depreſſed in Inſpiration and Exſpiration by the Help of no leſs than Fifty ſix Muſcles. Of thoſe that dilate it there are Fifteen on each Side, *viz.* the *Subclavius*, the *Serratus major*, the *Serratus poſterior ſuperior*, the *Serratus poſterior inferior*, and Eleven *Intercoſtales externi*.

The *Subclavius* has received its Name from its Situation under the *Clavicula*, its Origination being from the internal Part of the ſame Clavicle, and its Inſertion into the firſt Rib near the *Sternum*.

The *Serratus major* ariſes from the interior *Baſis* of the *Omoplata*, and is implanted to the Five true inferior Ribs, and to the two ſuperior ſpurious Ones, by Five Tendons, which reſemble the Teeth of a Saw.

The *Serratus ſuperior poſticus* has its Riſe from the Spine of the Three inferior *Vertebræ* of the Neck, and from the firſt of the Back, and terminates at the Three or Four upper Ribs by Indentation.

The *Serratus inferior poſticus* ariſes from the inferior *Vertebræ* of the Back, and from the firſt *Vertebra* of the Loins, and is inſerted into the three or four inferior Ribs.

The Eleven *Intercoſtales externi* do all of them ariſe from the inferior and exterior Part of each ſuperior Rib, and have their Inſertions obliquely into the anterior, ſuperior, and exterior Part of each inferior Rib.

Of the Muſcles that compreſs the *Thorax* or Cheſt, there are Thirteen on each Side, to wit, the *Sacrolumbaris* and the *Triangularis*, and the Eleven *Intercoſtales interni*.

The *Sacrolumbaris* has its Origination from the *Os Sacrum* and the *ſpinous Apophyſes* of the Loins, and is implanted into the ſuperior Ribs near unto their Roots, imparting to each of them a double Tendon.

The

The *Triangularis* ariſes from the interior and middle Part of the *Sternum*, and is inſerted into the Cartilages of the inferior Ribs as far as to the Second and the Third of the falſe or ſpurious Ones.

The Eleven *Intercoſtales externi* take their Riſe from the inferior and lower Part of each inferior Rib, and aſcending obliquely from behind forward, have their Inſertions into the inferior and interior Lip of each ſuperior Side. They fill up all the Interſtices of the Cartilages, which the *Intercoſtales externi* don't do. Either of them do interſect each other like a Croſs of *Burgundy*.

Of the Muſcles of the Back, and of the Loins.

THE Loins are bended, extended, and drawn towards the Ribs, by the Means of Six Muſcles, to wit, Three on each Side.

The Firſt of the *Flexores* or Benders, called the *Triangularis*, has its Origination from the ſuperior Part of the Side of the *Os Ilium*, and of the *Os Sacrum*, and is inſerted into the tranſverſe Proceſſes of the *Vertebræ* of the Loins, and into the laſt of the ſpurious Ribs.

The Firſt of the *Extenſores* or Extenders, called the *Sacer*, takes its Riſe from the poſterior Part of the *Os Sacrum*, is faſtened to the *Vertebræ* of the Loins, and advances as far as the Roots of the Spines of the *Vertebræ* of the Back.

The Second, called the *Semiſpinalis*, has its Riſe from the Spine of the *Os Sacrum*, and its Inſertion into the tranſverſe Proceſſes of the *Vertebræ* of the Back, as far as to the Neck.

It is obſervable, that when theſe Muſcles act ſeparately on either Side, they produce an oblique Motion in the Loins.

Of the Muſcles of the Abdomen *or lower Belly.*

THere are Ten Muſcles appertaining to the *Abdomen* or lower Belly, to wit, Five on each Side, *viz.* the Two *Obliqui aſcendens & deſcendens*, the *Rectus*, the *Pyramidalis*, and the *Tranſverſalis*, of which we ſhall have Occaſion to ſpeak in Particular in that Chapter which treats of the proper containing Parts of the lower Belly or *Venter*.

Of the Muſcles belonging to the Manly Yard, and the Teſticles.

THE *Penis* or Manly Yard is provided with Four Muſcles, to wit, Two *Erectores* and Two *Acceleratores*, and the Teſticles with two called the *Cremaſteres*, of all which we ſhall treat more at large in the Chapter of the Genital Parts of Men.

Of the Muſcles of the Clitoris.

THE *Clitoris*, in Women, has Four Muſcles, to wit, Two on each Side.

The Firſt of theſe is called the *Erector Clitoridis*, having its Origination from the Prominency of the *Os Iſhium*, and its Inſertion into the nervous Bodies of the *Clitoris*.

Its Uſe is to erect and render it rigid.

The Second is named the *Pudendus*, having its Riſe from the *Sphincter* of the *Anus*, with very large Beginnings, and is implanted into the *Clitoris*.

There are ſome Anatomiſts who, in Regard to the Situation of theſe Muſcles, are of Opinion, that their Uſe is rather to ſhorten the Neck of the Womb, than to erect the *Clitoris*.

Of the Muſcles of the Anus.

THE *Anus* has Four Muſcles, *viz.* Two *Sphincters*, and Two *Levatores*, one on each Side.

The *Sphincter Ani*, which bears a Reſemblance unto a Ring, and is divided into the *internus* and *externus*, ariſes from the anterior Part of the Manly Yard, and from the Neck of the Womb in Women; from the poſterior Part of the *Coccyx*, and laterally from the Ligaments of the *Os Sacrum*, and of the Haunches.

Its Uſe is, to open and ſhut the Paſſage for the Excrements.

The *Levator Ani* has its Riſe from the anterior and lateral Part of the *Os Iſhium*, and is inſerted into the *Sphincter* of the *Anus*.

Its

Its Uſe is to draw up the *Anus* after the ruſion of the Excrements.

Tis to be obſerved, that the *Paralyſis* of *Sphincter Ani* cauſes an involuntary iſſion of the Excrements; and that of the *ator* occaſions the *Procidentia Ani.*

Of the Muſcles of the Omoplata *or Shoulder-Blade.*

THE *Omoplata* or Shoulder-Blade is moved forwards and backwards, upwards and downwards, by the Means of Four Muſcles.

The Firſt, called the *Serratus minor*, being ſituated under the *Muſculus Pectoralis*, has its Origin from the oſſeous Part of the Five ſuperior Ribs, and is inſerted into the *Apophyſis Coracoides* of the *Omoplata.*

Its Uſe is to pull the Shoulder-Blade forwards.

The Second, called the *Trapezius*, has its Riſe from the *Os Occipitis*, from the Spines of the *Vertebræ* of the Neck, and from 8 or 9 *Vertebræ* of the Back, and has its Implantation to the *Baſis* and Spine of the *Omoplata.*

The Uſe of this Muſcle is to move the Shoulder-Blade upwards, backwards, and downwards.

The Third is called the *Rhomboides*, having its Poſition under the *Trapezius*, takes its Origination from the Spines of the Three inferior *Vertebræ* of the Neck, and the Three ſuperior of the Back, and has its Inſertion with a Tendon as large as its Beginning into the *Baſis* of the *Omoplata.*

The Uſe of this Muſcle is to draw the Shoulder-Blade backwards.

The Fourth, called the *Levator proprius Scapulæ*, has its Riſe from the tranſverſe *Apophyſes* of the Four firſt *Vertebræ* of the Neck, by ſeveral diſtinct Beginnings, which being reunited, are inſerted into the ſuperior Angle of the *Omoplata.*

Its Uſe is to pull the Shoulder-Blade or *Scapula* forwards, (or rather upwards.)

Of the Muſcles of the Arm.

THE *Humerus* or Arm is drawn upwards by the Means of the *Muſculi Deltoides* and *Supraſpinatus*, and is pull'd downwards by the Help of the *Teres major* and the *Latiſſimus Dorſi.* It is drawn forwards by the Aſſiſtance of the *Pectoralis* and the *Coracobrachialis*, and backwards by the *Infraſpinatus*, the *Subſcapularis*, and *Tranſverſalis*; and laſtly, it is moved circularly by all the Muſcles acting ſucceſſively.

The *Cubitus* has Five Muſcles, Two *Flexores* and Three *Extenſores.*

The *Radius* has Four, to wit, Two *Pronatores*, which turn the fore Arm and the Palm of the Hand downwards, and as many *Supinatores*, which turn the fore Arm and the Palm of the Hand upwards.

The *Carpus* or Wriſt has beſides the *Palmaris* Four Muſcles, *viz.* Two *Flexores*, which bend the Wriſt called the *Cubitæus internus*, and the *Radiæus internus*, and as many *Extenſores*, which extend the Wriſt called the *Cubitæus externus* and the *Radiæus externus.*

The various Motions of the Fingers, *viz.* of Flexion and Extenſion, of their being drawn nearer to, or further from the Thumb, are accompliſh'd by many Muſcles; of all which we ſhall have Occaſion to ſpeak more at large in the Fourth Book, where we ſhall treat *of the ſuperior Extremities* of the humane Body.

Of the Muſcles appertaining to the Thigh, and to the Leg.

THE Motion of Flexion in the Thigh is performed by the Means of the *Muſculus Iliacus*, and the *Pectinæus.* Its Extenſion is accompliſhed by the Help of the *Glutæus major*, the *Glutæus medius*, and the *Glutæus minor.*

The Thigh is pulled inwards by the *Muſculus Triceps*, and it is moved outwards by the *Quadrigemini*, and laſtly its oblique and circular Motion is performed by the *Obturator internus* and *externus.*

The Leg is bended and extended by the Means of Eight Muſcles. The *Flexores*, or thoſe that bend it, are the *Semiervoſus*, the *Semimembranoſus*, the *Muſculus Biceps*, and the *Gracilis poſterior.*

The *Extenſores*, or thoſe that extend it, are the *Muſculus Rectus*, the *Gracilis*, the

Vaſtus externus, the *Vaſtus internus*, and the *Cruræus*.

The Foot has Eight Muſcles, to wit, Two *Flexores* that bend it, *viz.* the *Tibialis anticus*, and the *Peronæus anticus*; and Six *Extenſores*, which extend it, *viz.* the *Gaſterocnemius interior* and *exterior*, the *Solæus*, the *Plantaris*, the *Tibialis poſticus*, and the *Peronæus poſticus*.

The Four leſſer Toes are bended, extended, and drawn to or from each other by the Means of Eighteen Muſcles.

Thoſe that perform the Motion of Flexion are the *Profundus* and *Sublimis*, thoſe that accompliſh the Motion of Extenſion are the *Muſculus longus* and the *brevis*, and thoſe that draw them from the great Toe are the *Musculi Lumbricales* and the *Interoſſei*.

Laſtly, the great Toe is provided with Four Muſcles, *viz.* One *Flexor*, or that which bends it; One *Extenſor*, or that which extends it; One *Abductor*, being that which draws the great Toe to the reſt; and lastly One *Abductor*, which draws it from the leſſer Toes.

Of all theſe, we ſhall have Occaſion to ſpeak in Particular in the Fourth Book, treating of the inferior Extremities.

A ſhort Recapitulation of the Names and Functions of all the Muſcles appertaining to each Part of the Humane Body.

OF the Muſcles of the hind Head, or hairy Scalp, there are Two Pair, *viz.* the *Occipitales*, which draw the Skin of the Hind-Head backwards; and the *Frontales*, which draw up and wrinkle the Skin of the Fore-Head.

To the Eye-lids belong alſo Two Pair, *viz.* the *Orbicularis Palpebrarum*, which draws together and ſhuts the Eye-lids, and the *Rectus Palpebræ ſuperioris*, or *Apericus Palpebram*. It lifts up the upper Eye-lid.

The Eye is moved by Six Pair of Muſcles, *viz.* the *Obliquus ſuperior (major)* or *Trochlearis*, which moves the Eye forwards, and obliquely downwards.

The *Obliquus inferior (minor)* which moves it upwards and outwards.

The *Elevator*, or *Attollens Oculi*, or *Superbus*, which draws the Eye upwards. The *Depreſſor* or *Deprimens Oculi*, or the *Humilis*; It draws the Eye downwards.

The *Abductor Oculi*, or *Bibitorius*, which inclines the Pupil to the Noſe; and the *Abductor Oculi*, which retracts it from the Noſe.

Of the Muſcles of the Noſe there are Three Pair, *viz.* the *Dilatores Alarum Naſi*, which pull up the *Alæ*, and dilate the Noſtrils.

The *Retractores Alarum Naſi*, and *Elevatores Labii ſuperioris*, whoſe Names declare their Uſe; and,

The *Conſtrictores Alarum Naſi*, ac Depr[eſſo]res *Labii ſuperioris*, which draw the *Ala* upper Lip downwards.

Nine Pair of Muſcles belong to the Cheeks and Lips.

The *Quadratus Genæ*, *ſeu Tetragonus*, by theſe Muſcles acting together, draw down the Mouth and the Cheeks when we expreſs our Sorrow.

The *Buccinator* pulls the Mouth to one Side, and thruſts the Aliments betwixt the Teeth.

The *Zygomaticus*, with its Fellow, draws both Lips upwards, and to either Side obliquely.

The *Elevator Labiorum*, its Name declares its Uſe.

The *Depreſſor Labiorum* draws down the Corners of the Mouth.

The *Conſtrictor Labiorum*, *Sphincter* & *Orbicularis Labiorum*, draws both Lips together.

The *Elevator Labii ſuperioris*, which draws the upper Lip upwards; and the *Depr[eſſor] Labii inferioris*; It depreſſes and turns the under Lip outwards.

The *Elevator Labii ſuperioris*; It pulls the Under Lip upwards.

To the external Ear belong Two Pair, viz. the *Attollens* and *Retrahens Auriculam*, whoſe Names declare their Uſe.

To the internal Ear belong Four Pair, *viz.* e *externus Auris*, *vel Laxator externus*, or *ternus Malleoli*. It draws the Handle of e *Malleus*, together with the *Tympanum*, rwards.

The *Obliquus Auris* or *Malleoli*.

The *internus Auris* or *Malleoli*. It draws the *Malleus* towards the *Os Petroſum*.

The *Maſculus Stapydis*. It moves the Stirrup upwards to the fore Part of the *Foramen Ovale*.

The Muſcles of the lower Jaw conſiſt of Six Pair: The *Temporalis* or *Crotaphites*, and the *Maſſeter*: Theſe draw the lower Jaw upwards.

The *Digaſtricus*, *ſeu Biventer*, pulls the Jaw downwards.

The *Pterigoidæus internus* draws the Jaw to either Side.

The *Pterigoidæus externus* draws the Jaw forwards.

The *Quadratus Venæ*, mentioned among the Muſcles of the Cheek.

To the *Uvula* or *Gargareon* belong two Pair, *viz.* the *Pterigoſtaphilinus externus*, or the *Sphænopalatinus*. It draws the *Uvula* upwards and backwards.

The *Pterigoſtaphilinus externus*, or *Pterigopalatinus*, *ſeu Sphænopterigopalatinus*, draws the *Gargareon* forwards and downwards.

Three Pair of Muſcles do appertain to the Tongue, *viz.*

The *Geniogloſſus*. It draws the Tongue forwards out of the Mouth.

The *Ceratogloſſus* draws it directly into the Mouth.

The *Styloglosſus* pulls it upwards and inwards in Deglutition.

The Muſcles of the *Os Hyoides* are Five Pair in Number.

The *Sternohyoidæus*, which draws the *Os Hyoides*, together with the Tongue and *Larynx*, directly downwards.

The *Coracohyoidæus* pulls them alſo downwards, and ſomewhat inwards.

The *Stylohyoidæus* pulls them upwards and to either Side.

The *Mylohyoidæus* moves the *Os Hyoides*, Tongue, and *Larynx* upwards, forwards, and to either Side, and compreſſes the *Glandulæ Sublinguales*, to further the Egreſs of the *Saliva*.

The *Geniohyoidæus* pulls the *Os Hyoides* upwards and forwards, and is ſubſervient to the *Geniogloſſi* in thruſting the Tongue outwards.

Four Pair of Muſcles appertain to the *Pharynx* or *Gula*. The *Stylopharingæus*, which draws upwards and dilates the *Gula*.

The *Pterigopharingæus* compreſſes the *Tonſillæ*, and the reſt of the *Glandules*, in the Evacuation of the *Mucus*.

The *Oeſophagæus*, or the *Sphincter* of the *Pharynx*; is ſubſervient to the former, in ſtraining the *Pharinx* and the *Glandules*.

The *Vaginalis Gulæ*.

The *Larynx* has Six Pair of Muſcles, and one ſingle one.

The *Parternothyroidæum* pulls the *Larynx* downwards.

The *Hyothyroidæus* pulls the *Thyroides* upwards.

The *Cricothyroidæum* pulls up the *Cartilago Annularis*.

The *Cricoarytænoidæum* opens the *Rimula*.

The *Cricoarytænoidæum Laterale* pulls the *Arytænois* ſideways.

The *Thyroarytænoidæum* ſhuts the *Rimula*, and,

The *Arytænoidæus* performs the ſame Office.

Ten Pair of Muſcles belong to the Head.

The *Splenius* pulls the Head directly backwards.

The *Complexus* moves it backwards to one Side.

The *Rectus major* draws the Head back upon the firſt *Vertebra*.

The *Rectus minor* nods the Head backwards.

The *Obliquus inferior*, *ſuperior*, and the *Maſtoideus*, perform the ſemicircular Motion to either Side of the Head.

The *Rectus internus major* nods or bends the Head forward.

The *Rectus internus minor* has the ſame Office.

The *Rectus lateralis* bends or nods the Head to one Side.

To the Neck belong Four Pair of Muſcles, *viz.*

The *Longus Colli* bends the Neck directly forwards.

The *Spinalis Colli* draws the *Vertebræ* of the Neck right backwards.

The *Tranſverſalis Colli* draws the *Vertebræ* of the Neck obliquely backwards.

The *Interſpinalis Colli* pulls the Spines of the *Vertebræ* of the Neck nearer each other.

The *Thorax*, on its fore and back Part, is provided with a conſiderable Number of Muſcles for its various Motions, *viz.*

The *Intercoſtales externi* and *interni* pull the Ribs upwards in Inſpiration.

The *Triangularis*. Its Uſe is to contract the Cheſt.

The *Scalenus primus* draws the Ribs upwards in Inſpiration.

The *Scalenus ſecundus* and *tertius* elevate the Cheſt.

The *Subclavius* depreſſes the *Clavicula*.

The *Serratus minor anticus* dilates the Breaſt in Inſpiration.

The *Serratus major anticus* has the ſame Office.

The *Diaphragma*. Its Uſe is too large to be inſerted here.

The *Serratus ſuperior poſticus* is ſubſervient in drawing the Ribs or *Thorax* upwards.

The *Sacrolumbaris*.

The *Abdomen*, or lower Belly, is moved by Five Pair of Muſcles, *viz.*

The *Obliquus deſcendens ſeu declivis* compreſſes the Inteſtines and Bladder in excluding the *Fæces*, *Urine*, and the *Fœtus* in Women; and turns the Trunk upon the Axis of the *Vertebræ*.

The *Obliquus aſcendens ſeu acclivis*, concurs with the former in the ſame Functions.

The *Pyramidalis ſeu Succenturiatus* ſupports the *Abdomen*, and pulls the Navel inwards.

The *Rectus* moves the *Vertebræ* of the Loins nearer the *Os Ilium* laterally.

The *Tranſverſalis* preſſes the *Abdomen* directly inwards.

Four Pair of Muſcles belong to the Back, *viz.*

The *Dorſi longiſſimus* keeps the Trunk of the Body erect.

The *Quadratus Lumbarum* performs the ſame Office with the *Rectus Abdominis*.

The *Sacer* or *tranſverſalis Lumbarum*, and the *Semiſpinatus*, or *Tranſverſalis Dorſi*, move the *Vertebræ* of the Neck, Back, and Loins, obliquely backwards.

One Pair of Muſcles belong to the Teſticles, called the *Cremaſter*, or *Suſpenſor Teſticuli*. Its Name ſhews its Uſe.

Five Pair of Muſcles appertain to the Privy-Parts, to wit, three Pair to the *Penis* in Men, and two Pair to the *Clitoris* in Women.

The *Acceleratores Urinæ* drive out the Remains of Urine, and further the Ejaculation of the *Semen* in the Venereal Act, by compreſſing the Urinal Paſſages, and are ſubſervient to the *Erectores* in the Erection of the Manly Yard.

The *Erectores, ſeu Erigentes Penis*, they pull the Manly Yard towards the *Oſſa Pubis*, and thus procure Erection.

The *Tranſverſalis Penis*.

The *Erectores Clitoridis*. Their Uſe is the ſame with the *Erectores Penis*.

The *Sphincter Vaginæ*. It contracts the *Vagina*, and diſtends the *Labia* of the *Pudenda*.

Two Muſcles belong to the Bladder, *viz.*

The *Detruſor Urinæ*. Its Name declares its Uſe.

The *Sphincter Veſicæ* contracts the Neck of the Bladder, to prevent the involuntary Egreſs of Urine.

The *Anus* has Three Muſcles belonging to it, *viz.*

The *Sphincter Ani*, whoſe Office is to retain the Excrements.

The *Levatores Ani*. They draw the *Anus* upwards, to prevent the *Fæces* from preſſing upon the *Sphincter*; and further the Ejaculation of the *Semen* in the venereal Act.

To the *Scapula* or Shoulder-Blade belong Three Pair of Muſcles, *viz.*

The *Trapezius* or *Cucullaris*, which moves the *Scapula* obliquely upwards, directly backwards, and obliquely downwards.

The *Rhomboides* draws the Shoulder Blade upwards and backwards.

The *Levator Scapulæ* pulls the Shoulder Blade upwards.

The Muſcles belonging to the *Humerus*, or Arm, conſiſt of Nine Pair.

The *Pectoralis* moves the Arm directly forwards, obliquely downwards, or directly forwards.

The *Deltoides* lifts the Arm directly upwards, and ſomewhat forwards and backwards.

The *Supraſpinatus* lifts the Arm upwards towards the *Occiput*.

The *Infraſpinatus* moves the Arm directly upwards.

The *Teres minor* moves the Arm ſomewhat backwards and downwards.

The *Teres major* draws the Arm downward.

The *Latiſſimus Dorſi, ſeu Aniſcaptor*, pulls alſo the Arm downwards.

The *Coracobrachialis*; it lifts the Arm upwards, and moves it ſomewhat obliquely outward.

The *Subſcapularis* draws the Arm backwards, nearer the Trunk of the Body.

The Cubit or fore Arm has Five Pair of Muſcles belonging to it, *viz.*

The *Biceps*, which bends the fore Arm.

The *Brachiæus internus*. Its Uſe is the ſame with the former.

The *Gemellus* extends the Cubit.

The *Brachiæus externus*. Its Office is the ſame with the former.

The *Anconæus*. This alſo extends the fore Arm.

Four Pair of Muſcles do appertain to the *Radius, viz.*

The *Pronator Radii Teres*, or *Rotundus ſuperior*; and the *Pronator Radii Quadratus*, perform the Motion of Pronation; *i. e.* they turn the Palm of the Hand in or downwards.

The *Supinator Radii longus*, and the *Supinator Radii brevis*, perform the Motion of Supination, *i. e.* they turn the Palm of the Hand upwards.

The *Carpus* or Wriſt is moved by Four Pair of Muſcles, *viz.*

The *Flexor Carpi Radialis*, or *Radiæus internus*, and the *Flexor Carpi Ulnaris*, or *Cubitæus internus*, bend the *Carpus* or Wriſt.

The *Extenſor Carpi Radialis*, or *Radiæus externus*, and the *Extenſor Carpi Ulnaris*, or *Cubitæus externus*, do extend the Wriſt.

The Motions of the Palm of the Hand are performed by Two Pair of Muſcles, *viz.*

The *Palmaris longus*; it aſſiſts the Hand in graſping any Thing cloſely.

The *Palmaris brevis* draws the *Mons Lunæ* towards the *Os Metacarpi* of the little Finger, and thus makes a Concavity in the Palm of the Hand.

The Four Fingers are moved by a conſiderable Number of Muſcles, *viz.*

The *Perforatus ſublimis*, or *Flexor ſecundi Internodii Digitorum*, bends the Fingers according to their Name.

The *Perforans* or *Profundus*, and *Flexor tertii Internodii Digitorum*, bends the Fingers according to its Name.

The *Lumbricales*, or *Flexores primi Internodii Digitorum*, bend the firſt Joint of the Fingers as their Name declares.

The *Extenſor Digitorum Communis, ſeu Digitorum Tenſor*; it extends the Fingers according to its Name.

The *Extenſor Indicis, ſeu Indicator*, extends the *Index* or fore Finger according to its Name.

The *Abductor Indicis* draws the fore Finger from the reſt, as its Name declares.

The *Extenſor minimi Digiti*, or *Auricularis*. Its Name declares its Uſe.

The *Hypotenar*, or *Abductor minimi Digiti*, draws the little Finger from the reſt.

The *Interoſſei Manus interni* and *externi* do draw the Fingers to and from the Thumb, and when they act altogether, they divaricate the Fingers.

The Muſcles of the Thumb are Seven, *viz.*

The *Flexor tertii Internodii, ſeu longiſſimus Pollicis*, bends the third Internode of the Thumb.

The *Abductor Pollicis*, or *Tenar*, draws the Thumb from the Fingers, according to its Name.

The *Flexor primi & ſecundi Oſſis Pollicis* bends the firſt Bone and Second Internode of the Thumb.

The *Abductor Pollicis*, or *Antithenar*, draws the Thumb nearer the fore Finger.

The *Extenſor primi Internodii Oſſis Pollicis* extends the firſt Internode of the Thumb, according to its Name.

The *Extenſor ſecundi Internodii Oſſis Pollicis* extends the ſecond Internode of the Thumb, as his Name declares.

The *Extenſor tertii Internodii Oſſis Pollicis* does not only extend the Thumb, but alſo brings it ſomewhat backwards.

The Motions of the Thigh are performed by Twelve Pair of Muſcles, *viz.*

The *Pſoas Parvus* and *Pſoas magnus, ſeu Lumbalis*, move the Thigh forward in Walking.

The *Iliacus internus* concurs with the former in their Action.

The *Pectinæus* not only draws the *Os Femoris* upwards, but alſo directs it outwards.

The *Glutæus major*; it pulls the Thigh directly backwards.

The *Glutæus medius* extends the Thigh in Conjunction with the former Muſcle, and is ſubſervient to the Divarication of the Legs, together with the *Muſculus Membranoſus*.

The *Glutæus minor*; it aſſiſts the former in all its Actions, and are aſſiſting in rendring the Articulation of the *Os Femoris* with the *Coxa* more ſtable when we are ſtanding upright.

The *Pyriformis, ſeu Iliacus externus*, moves the Thigh ſomewhat upwards, and turns it outwards.

The *Marſupialis, ſeu Burſalis*, or *Obturator internus*, turns alſo the *Os Femoris* outwards.

The *Quadratus Femoris*; it is Aſſiſtant to the next preceding in turning the Thigh outwards.

The *Triceps* pulls the Thigh-bone upward, inward, backward, and outward, according to the Diverſity of its ſeveral Beginnings.

Eleven Pair of Muſcles belong to the Leg, *viz.*

The *Membranoſus* turns the Leg and Thigh outwards.

The *Sartorius, ſeu longiſſimus Femoris, ſeu Faſcialis*, makes the Legs croſs one another.

The *Gracilis* aſſiſteth the former and following in bending the Thigh and Leg inwards.

The *Seminervoſus, ſeu Semitendinoſus*, with the preceding, bends the *Tibia* directly backwards.

The *Semimembranoſus* bends the Leg alſo.

The *Biceps*; it bends the *Tibia* alſo, and turns the Leg, Foot, and Toes outwards, when we ſit with the Knees bended.

The *Poplitæus, ſeu Subpoplitæus*; it alſo bends the Knees, and turns the Foot and Toes outwards.

The *Rectus Femoris* extends the Leg.

The *Vaſtus internus* and *externus* perform the ſame Office with the next preceding.

The *Conræus*, or *Femoræus*, is alſo an Extender of the Leg.

Of the Muſcles of the Foot or *Tarſus* there are Seven Pair, *viz.*

The *Gaſterocnemius externus, it. Gemellus*, extends or pulls the Foot backwards.

The *Plantaris* defends the ſubjacent Tendons, Nerves, and ſanguineous Veſſels from being compreſs'd in Walking, *&c.*

The *Gaſterocnemius internus, ſeu Solæus*, extends the Foot.

The *Tibialis Anticus, ſeu Muſculus Catena*, pulls the Foot forwards and upwards directly.

The *Peronæus primus, ſeu longus*, and the *Peronæus ſecundus, ſeu Semifibulæus*, pull the Foot and Toes outwards.

The *Tibialis poſticus* moves the Foot inwards and upwards.

The great Toes have their Motions performed by Six Pair of Muſcles, *viz.*

The *Extenſor Pollicis longus* extends the great Toe.

The *Extenſor Pollicis brevis* extends or pulls the Second Bone of the great Toe upwards.

The *Flexor Pollicis longus* bends the great Toe.

The *Flexor Pollicis brevis*: It bends the Second Bone of the great Toe.

The *Abductor Pollicis*, or *Tenar*, draws the great Toe from the reſt.

The *Abductor Pollicis*, or *Antitenar*, brings the great Toe nearer to the reſt.

The Four leſſer Toes are moved by a conſiderable Number of Muſcles, *viz.*

The *Extenſor Digitorum Pedis longus* extends the Four leſſer Toes.

The *Extenſor Digitorum brevis* performs the ſame Office.

The *Perforatus, ſeu Sublimis, ſeu Flexor ſecundi Internodii Digitorum Pedis*, bends the Second Internode of the Four leſſer Toes.

The *Perforans, ſeu Flexor tertii Internodii Digitorum Pedis*, bends the third Internode of the Four leſſer Toes, according to its Name.

The *Lumbricales* bend the Four leſſer Toes.

The *Abductor minimi Digiti* pulls the little Toe from the other leſſer Toes.

The *Tranſverſalis Pedis* brings the leſſer Toes

oes close to one another, and towards the eat Toe.

The *Flexor primi Ossis minimi Digiti.* Its ame declares its Use.

The Seven *Interossei Pedis* are as follows:

The *Abductor minimi Digiti.* Its Name lares its Use.

The *Abductor Auricularis* draws the next oe towards the lesser.

The *Abductor Auricularius* antagonizes the former.

The *Abductor medii Digiti*, and the *Abductor* of the same Toe. Their Names declare their Offices.

The *Abductor Indicis Pedis*, and the *Abductor* of the same Toe. Their Names discover their Functions.

Myologia, *or the Doctrine of the Muscles. Taken out of Mr.* William Cowper's Myotomia Reformata, *or a new Administration of all the Muscles of Humane Bodies.*

CHAP. I.

Of the Muscles of the Abdomen *of the lower Belly.*

IN the Administration of a humane Body 'tis best to begin with the lower *Venter* or Belly, lest the Putrefaction the *Viscera* should prove offensive. Here cision is to be made through the common teguments of the Body in a crucial Form, that the first and direct Line begins at the *rtilago Xiphoides*, and so is continued downrds to the *Os Pubis*. The other transrse is to be made from the Navel to both des, to the Region of the Loins; after hich the Skin, Fat, and Membranes of each ortion being raised from each of their Anles, the Muscles of the lower *Venter* or Bel will appear in their natural Position; me of them being seated in the anterior rt only, some on the lateral, and some on posterior, which last however may be ore properly referred to the Back and oins. We intend in their Enumeration to eat of them according to the Order that y appear in Dissections.

The First therefore that presents it self e, is,

The *Obliquus descendens, seu declivis.*

Having obtained its Name from the Progress of its Fibres, it has its Rise with several acute Productions, partly fleshy, partly tendinous, from the inferior Edge of the Fifth, Sixth, Seventh, and Eighth Ribs, where these separate Originations have their Positions, between the Indentations of the *Musculus Serratus major Anticus.* These we will call its first Origin, because this Muscle continues to derive, besides these, some more Heads in like Manner from the Ninth, Tenth, and Eleventh, and sometimes also from the Extremity of the last spurious Rib, where it is likewise indented with the *Serratus inferior Posticus.*

From its first Origination, its oblique descending fleshy Part is expanded into a broad membranous Tendon, before it passes the *Musculus rectus* to its Insertion in the *Linea alba* and *Os Pubis*; and from its latter Origin it descends in the same Manner, and ends partly Tendinous in the *Ligamentum Pubis*, but chiefly Fleshy on the superior and anterior Part of the circular Edge of the *Os Ilium.*

It does not adhere to the transverse Processes of the *Vertebræ* of the Loins, as most Anatomists have been of Opinion that it does, but its largest, last and most fleshy

Digitation, leaving then the lowermoſt ſpurious Rib at its Extremity, and in its oblique Deſcent declining forwards, ſtill recedes gradually more and more from theſe *Vertebræ*, and make a triangular Interval, comprehended by the *Sacrolumbus* and the *Os Ilium*, and its inferior Side; in this *Area* the Fibres of the ſubjacent Muſcle do plainly appear.

Beſides thoſe Actions that are commonly attributed to this Muſcle and its Fellow, together with the reſt of their Fellows, *viz.* the Compreſſion of the Inteſtines and Bladder, as well for the Excluſion of the *Fæces* and Urine as of the *Fœtus* in Women, they have a more noble Uſe belonging to them; For that Part of either of them, which is interjacent between their latter Origination and Space of the *Os Ilium*, does bear an Analogy in its Situation to the *Muſculus Maſtoidæus* of the Head; and this ſerves for the Circumrotator of the Trunk upon the *Axis* of the *Vertebræ* when we turn our Body to the contrary Side, the Feet remaining unmoved, for which neceſſary Motion, the Authors have hitherto not aſſigned any peculiar Inſtrument.

The Diſſection of the Abdominal Muſcles is to be performed thus: The Body being ſupported on its Side, the *Dorſi Latiſſimus* of the Oppoſite muſt be clear'd from its ſeveral fleſhy Originations, at the incurvated Parts of the Ribs, as likewiſe the Tendinous Part of it, which ariſes from the Margin of the *Os Ilium*. After this, the Blood being dryed and the Fat cleared, (which muſt be done at all Times) the Originations of the aforeſaid *Obliquus Deſcendens* will appear.

You now may proceed to its Separation, by thruſting your Fore-finger betwixt it and the following Muſcle in the beforementioned Interval; then raiſe that part of it which ſprings from the lowermoſt Rib, and ends in the Spine of the *Os Ilium*, and then proceed to clear the reſt of its Digitations from between the four *Serrati*; but take Care not to wound its Tendon whilſt you ſeparate it from the ſubjacent Muſcle, eſpecially where it paſſes over the *Rectus*: Their Separation is not to be attempted in every Subject, by Reaſon of their ſtrict Adheſion, and therefore in preparing theſe Muſcles, when you are to demonſtrate the after Diſſection, you may proceed after the following Method.

The *Obliquus Aſcendens* being raiſed on both Sides (as has been ſaid) to the *Rectus* cut thro' and raiſe both Tendons together ſo as to leave them at their Inſertions in the *Linea alba*, and to take Care in their Separation from the Interſections of the *Rectus*. Then on the contrary Side raiſe its carneous Part only, ſo as to begin in the *Linea Semilunaris*, by making an Aperture in its Tendon toward its inferior Part, where it may be divided from that of the following Muſcle. Introduce a Probe betwixt the two Tendons, and divide this ſuperior One thro' the Length of the lower Belly: This done the carneous Part on this Side being raiſed likewiſe and freed to the Ends of its Digitations, and left there, raiſe the *Oblique Aſcendent*, and on the ſame Side you rais'd the former towards its Origin, raiſe this *a Contrario*, and thus purſue it to the *Linea alba* where you muſt leave it. On the oppoſite Side, its carneous Portion you may raiſe to its Origination, and the reſt of theſe Muſcles then appearing in their proper Poſition ſtand not in Need of any further Diſſection.

The *Obliquus aſcendens*, has obtained its Denomination from the oblique Aſcent of its Fibres; neither of theſe Muſcles have any Communication with the *Vertebræ* of the Loins, no more than the preceding (contrary to what has been aſſerted by moſt Anatomiſts) it ariſes fleſhy from the whole circular Margin of the *Os Ilium* and *Ligamentum Pubis*, without any thin Membrane ariſing either from the Loins or *Os Sacrum*, as *Veſalius* will have it, or from the Points of their tranſverſe Proceſſes, as others affirm; from thence aſcending with an Order of Fibres forwards, does form a broad membranous thin Tendon, implanted into the whole Length of the *Linea Alba* and the Cartilages of the Eighth, Ninth, Tenth, Eleventh, and Twelfth Ribs.

Beſides its common Uſe in the Compreſſion of the *Abdomen*, and what is contained therein, that Portion of it which ariſes fleſhy towards the back Part of the Margin of the *Os Ilium*, by its oblique aſcending Fibres to the cartilaginous Extremities of

bs, not only produces a Depreſſion in
m, and ſtreightens the Cavity of the
rax in Expiration, but in regard the
der of its Fibres does interſect thoſe of
former Muſcle on the ſame Side, may
tagoniſe it in the Circumrotation of the
unk of the Body of the *Axis* of the *Ver-*
a; as on its contrary Side, its Order of
hy Fibres being parallel to thoſe of the
Deſcendens on the oppoſite Side may act
Concurrence within, in Diſcharge of its
nction. So that, according to the Stru-
re and reciprocal Cooperation of theſe
uſcles, the *Aſcendens* on the Right, and
Deſcendens of the Left, turn the Body
the Right, and *vice verſa*.

The *Pyramidalis vel Succenturiatus* appears
ext, being placed on the *Rectus*, having
ained its Name from its Figure, which
inning from a broad *Baſis*, and termina-
g in a Point, reſembles unto a Pyramid.
has its Riſe on the ſuperior Part of the
Pubis, and as it aſcends is leſſened gradu-
ly into a long Tendon, and is inſerted in-
the Navel.

Riolan has obſerved the Left of theſe Muſ-
cles to be the Leſſer, and if either be abſent,
it moſt commonly is that. And *Fallopius*
(who was the firſt Diſcoverer of them) tells
us, that they compreſs the Urinary Bladder;
whereas *Fabricius ab Aquapendente* is of Opi-
nion, that they ſerve for a Support to the
Abdomen, and prevent its ſuperior Parts
from preſſing too forcibly upon the Inferi-
or; which Opinion owing its Origin to the
obſerving the Anatomical Subject in a ſu-
pine Poſition, we look upon the following
as its moſt natural Uſe.

When by the Preſſure of the *Diaphragma*
upon the *Viſcera* the lower Belly is become
turned, theſe pull the Navel downwards,
which produces a more adequate Compreſſion
of the Urinary Bladder in the Expulſion of
Urine, than what is made by any other
Muſcle of this Part, tho' they all concur in
that Action: They have been called *Succen-*
turiati or Auxiliary Muſcles, becauſe *Fallo-*
pius did ſuppoſe them to be no more than
ſupplemental to the following in their
Functions, becauſe the *Series* of the Fibres
the ſame in both, and theſe being always
ſent when theſe are continued fleſhy
to the Connexion of the Bones of the *Pubes*.

The *Rectus* is ſo called from the Rectitude of its Situation, but the Authors are of different Opinions, concerning its Origination, which ſome derive from the *Sternum*, and others from the *Oſſa Pubis*; but this Controverſy is of no great Conſequence, ſince either Part is indifferently moved by it, the Oppoſite remaining ſtable. Little is to be added to the common Deſcription of the Muſcles, they being extended according to the Length of the *Abdomen* from the *Cartilago Xiphoides*, and two of the Cartilages of the *True*, and as many of the *Spurious* Ribs down to the *Os Pubis*, and divided into four or five Portions by three or four intermediate tranſverſe Tendinous Interſections.

Underneath its ſuperior Part do paſs the Mammary Artery deſcending, and its Vein aſcending; thoſe of its inferior Part are the Epigaſtrick Artery aſcending, and its Vein deſcending. The Incloſure of this Muſcle in the double Tendon of the *Aſcendans* I could never diſcover as yet, and therefore am of Opinion, that the Adheſion of the aſcending Tendon to that of the following Muſcle in the *Linea Semilunaris* did occaſion the Miſtake.

The *Tranſverſalis* has obtained its Name from the Stretching of its Fibres tranſverſedly over the lower Belly. This Muſcle has not its Riſe that it is commonly given out from any Ligament, whether ſpringing from the *Os Sacrum*, or covering the *Sacrolumbus*; but as *Columbus* has well obſerved, from the tranſverſe Proceſſes of the *Vertebræ* of the Loins, the Spine of the *Os Ilium*, *Ligamentum Pubis*, and the cartilagineous Extremities of the Ribs, below the *Sternum*; from whence its carneous Part ſtretches over the convex Surface of the *Peritonæum*, and becomes a broad expanded Tendon, before it paſſes under the *Rectus* to its Implantation in the whole Length of the *Linea Alba*. The Uſe or Action of this Muſcle with its Fellow, is to preſs the lower Belly directly inwards as in Expiration. *Caſpar Bartholin* has obſerved, part of this Muſcle continues with the Diaphragm at the cartilaginous Extremities of the Ribs below the *Sternum*

in

in *Quadrupeds* of the larger Size, whence he concludes the Diaphragm to be a *Trigaſtrick* Muſcle: But whether this Obſervation may be applied to a Humane Body whoſe Poſture being erect has a different manner of Reſpiration from the four-footed Animals, I muſt leave undetermined till Experience may afford us a more ſatisfactory Information. Thro' this and the aſcending Muſcle the ſpermatick Veſſels take their Paſſage near the Groins in the Mid-way, between the Fore-part of the Spine of the *Os Ilium* and *Os Pubis*, from whence deſcending for ſome Space between the fleſhy Part of the laſt mentioned Tendon of the *Obliquus Deſcendens*, they paſs thro' a Fiſſure of the ſaid Tendon, near the laſt named Bone. Theſe Perforations were by a peculiar Contrivance of Nature not made exactly correſponding to one another, to prevent a *Prolapſus* of the Inteſtines thro' them, not much unlike the oblique Inſertion of the *Ureteres* and *Ductus Bilearius* paſſing betwixt the Membranes of the Inteſtines and Bladder, to prevent the Retroceſſion of the Bile in one, and of the Urine in the other.

You muſt be cautious in the Diſſection of theſe Muſcles not to wound the *Cremaſter* on either Side. The *Peritonæum* with its Contents offer themſelves next to our View, but they not belonging to our preſent Enquiry, they muſt be all removed, and then proceed to the Muſcles of thoſe Parts, which for conveniency of Diſſection, muſt fall next under our Examination, *viz.* the *Teſtes*, *Penis*, Urinary Bladder, and the *Anus*.

Here the Anatomical Body muſt be placed with the Buttocks at the Edge of the Table, ſo that its Legs being divaricated, the *Operator* may place himſelf betwixt them, and proceed in the Diviſion of the Skin, Fat, and Membranes, by a Semicircular Section on each Side of the *Pubes* meeting in the *Perinæum* near the *Anus*, and begin to raiſe the Skin of the upper Part of the *Penis*, freeing it from the Spermatick Veſſels, and next raiſing that Part which lies in the *Perinæum*; which being done, and the Fat taken off, the following Muſcles will preſent themſelves to your View.

CHAP. II.

Of the Muſcles of the Teſticles.

EAch of the Teſticles is provided with one proper Muſcle called *Cremaſter*. *Riolan* adds a Third, which he ſays is common to both, comprehending them in the Manner of a Bag, and ſerving for their Succuſſation; but this is by other Authors look'd upon as a Membrane only, called *Dartes*.

The *Cremaſter* or *Suſpenſor Teſticuli*, has its Riſe fleſhy from the inferior and anterior Part of the Spine of the *Os Ilium*, and the ſuperior Part of the *Ligamentum Pubis*. Its Fibres ſtretch parallel with thoſe of the *Obliquus Aſcendens* (but not with the *Tranſverſalis*, as *Bartholin* objects to *Riolan*) encompaſſing almoſt the Proceſs of the *Peritonæum*, and deſcending on it to its inferior Part, where the Teſticle is placed. Its Name ſhews its Function.

CHAP. III.

Of the Muſcles of the Manly Yard.

TWO Pair of Muſcles are generally attributed by the Authors to the Manly Yard, *viz.* the *Acceleratores Urinæ* and *Erectores Penis*; unto which *Fabricius ab Aquapendente* has added a third Pair, which are mentioned alſo, and expreſs'd by *Bidloo* in his 47*th* Table.

The *Acceleratores Urinæ* have obtained their Denomination from their Office of Acceleration, the Ejection of Urine and Seed. The Anatomiſts have erroneouſly aſſigned the Originations of theſe Muſcles either to the *Sphincter Ani*, or to the Protuberancies of the *Oſſa Iſhii*, for they have their Riſe fleſhy from the ſuperior Part of the Urinary Paſſage, as it paſſes under the *Oſſa Pubis*, and encompaſſing the exterior Part of the Bulb of its cavernous Body, both Muſcles meet on the inferior Part, and ſtretch according to the Length of the Seam of the Skin of the *Perinæum* parting from each

er. They aſcend to their Inſertions on h Side the *Corpora Cavernoſa Penis.*

The common Uſe, commonly attributed theſe Muſcles is, by a Compreſſion of *Urethra*, to ſqueeze out the Remains of Urine, and promote the Ejaculation of Seed in Coition; (which Function is efly performed by the laſt deſcribed Part them that encompaſſes the *Urethra*, as y paſs on to their Inſertions on each e of the cavernous Bodies of the Manly rd.) But beſides this Uſe, they are Aſtant alſo to the following Muſcles in its ction, by driving the Blood contained in Bulb of the cavernous Body of the uriry Paſſage towards the Glans in greater antities, whereby it becomes diſtended, Veins which carry back the refluent od from the *Corpus Cavernoſum* of the *ethra*, being compreſs'd at that time by Tumefaction of theſe Muſcles.

The *Erectores ſeu Erigentes Penis*, called o the *Directores*, and by *Spigelius Collateles Penis*, have their Riſe from the exterior ob or Protuberancy, below the Beginng of the cavernous Bodies of the *Penis*, whoſe thick Membrane they are inſerted.

The Uſe of theſe Muſcles is, to pull the anly Yard towards the *Oſſa Pubis*, where- the great Vein being compreſs'd and the ſſage of the refluent Blood intercepted der theſe Bones, by this Means the Man- Yard is erected; of which more hereer.

The *tranſverſalis Penis*, ſo named from its uation: They are mentioned by *Linda-* after *Aquapendens*, and have their Riſe r the former, from whence they extend niverſedly to the upper Part of the Bulb the cavernous Body of the *Urethra* where ir Inſertions are.

Unto theſe may be added alſo the Muſs of the *Clitoris*, and that of the *Pudendum* Women.

Concerning the Number of the Muſcles onging to the *Clitoris*, the Authors don't y well agree. *Fallopius*, (who firſt took tice of them) and thoſe that follow him, ong which is *de Graef*, reckons but one r of them, but others two Pair: The firſt inion is the moſt probable. They have peculiar Names, but ſince they are near the ſame with the *Erectores Penis*, from which they differ in Magnitude only, they may be very properly called by the Name alſo of *Erectores Clitoris*, which ariſe fleſhy from the external Edge of the *Os Iſchium*, and are implanted into the Beginning of the cavernous Body of the *Clitoris.*

Their Action is the ſame with the *Erectores Penis*; the ſecond Pair aſcribed to this Part by ſome Anatomiſts, being a Portion only of the following, adhering to it, *viz.* The *Sphincter Vaginæ*, which being placed immediately under the *Clitoris*, embraces the *Vagina* with its circular Fibres three Fingers in breadth; in ſome Subjects it does ſeem fleſhy.

The Action and Uſe of this Muſcle is not only to ſtreighten the *Vagina*, but alſo thereby to ſtop the free Paſſage of the Blood in its return from the *Plexus Retiformis* of the *Pudendum*, by compreſſing ſome of its ſubjacent Veins which paſs underneath, whereby the *Labia* being diſtended, the *Vagina* is contracted.

CHAP. IV.

Of the Muſcles of the Urinary Bladder.

THE Antients take notice but of one Muſcle appertaining to this Part, call'd the *Sphincter*; but *Fabricius ab Aquapendente* makes mention of another, unto which *Spigelius* has given the Name of *Detruſor Urinæ.* This is by ſome reckoned the firſt Membrane of the Urinary Bladder, being placed under that which is derived from the *Peritonæum*; its fleſhy Fibres embrace the whole Bladder like a Hand, (according to *Spigelius*) and ſo compreſſes it to further the Evacuation of *Urine*, which is its Uſe.

The *Sphincter Veſicæ* has (according to *Fallopius*) not been rightly repreſented by the Authors of his Age, who have placed it below the *Proſtatæ*, in which Caſe he ſays, the Seed in Coition could not be emitted without the Urine; notwithſtanding which, this Obſervation has been neglected by later Anatomiſts, either thro' Inadvertency in their Diſſection, or being impoſed upon by

part of the *Levatores Ani*, which remained on the *Proſtates*, which *Riolan* calls the *Sphincter externus*. Its Situation is on the ſuperior Part of the Neck of the Bladder immediately above the *Glandulæ Proſtatæ*; where, ſays *Fallopius*, there is not an entire Muſcle and Subſtance diſtinct from the Subject *Canal*, like that of the *Anus*, but the more fleſhy Part of the Neck of the Bladder conſiſting of many tranſverſe Fibres, which by their Contraction prevent the involuntary Emiſſion of Urine.

N. B. Fallopius ſays, that when you intend to diſcover theſe tranſverſe Fibres, you muſt blow up the Bladder and dip it in ſcalding Water; the external right Fibres being removed, theſe will appear underneath.

CHAP. V.

Of the Muſcles of the Anus.

THE *Penis*, together with the Urinary Bladder, being removed, the Muſcles belonging to the *Anus* do preſent themſelves to your View. *Galen* diſtinguiſhes the *Sphincter* of the *Anus* into the *Carnoſus* and *Cutaneus*, which with the two *Levatores* make up Four belonging to this Part: But *Riolan* reckons no leſs than Nine of them; *viz.* three *Sphincters*, the *Carnoſus* or exterior *Cutaneus*, or the Middle, and *Vaginalis* or the Superior and Interior; and ſix *Elevatores*, *viz.* two Internal, and four External. But this Aſſertion is founded rather upon ſome particular Subject than a general Appearance of them, in the Diſſections of humane Bodies.

The *Sphincter Ani* is a large, thick, fleſhy Muſcle encompaſſing the *Anus*, its Figure and Order of Fibres on the Outſide immediately under the Skin reſemble unto an oblong Oval. It is conjoin'd forwards with the *Accelerator Urinæ*; backwards to the *Os Coccygis*; and as it is continued farther upon the Body of the *Inteſtinum rectum*, its Fibres run circular for near two Inches in Breadth. This Muſcle is much larger in them than in other Animals; becauſe, by Reaſon of the erect Poſition of their Body, there was a greater Force required in them to retain the *Fæces*, which is the t Office of this Muſcle.

The *Levatores Ani* ariſe fleſhy from e Side of the *Oſſa Pubis* on the interior S within the *Pelvis*, as likewiſe from part the *Os Iſhium* and *Sacrum*, from theſe Pl like Lines drawn from a Circumference t Centre; its Fibres deſcend over the *Muſ li Marſupiales*, to their Implantation at t lower End of the *Inteſtinum rectum* in t *Anus*. *Riolan* does contradict *Spigelius* the Deſcription of theſe Muſcles. The chief Uſe or Office is to ſuſpend and dra the *Anus* upwards, to hinder the *Fæces* fro being burthenſome to the *Sphincter*. their Deſcent on both Sides forwards fro *Oſſa Pubis*, they take their Paſſage clo over the *Glanduli Proſtatæ* in a Manner em bracing them, by which means they a render'd capable of Compreſſing them, an by Retraction of the *Anus* at the ſame Ti perform their Action upon the *Veſiculæ Se minales*, to promote the Ejaculation of th *Semen* in the *Venereal* Act.

The Muſcles of the Hairy Scalp, of th Forehead, *&c.* are the next that follow i due Order.

CHAP. VI.

Of the Muſcles of the Hairy Scalp, an Forehead.

WHEN you propoſe to enter upon Demonſtration of theſe Muſcles, yo may do it in the following Manner. Mak Inciſion thro' the common Teguments o the Head, ſo as to continue the Firſt an direct Line of Diviſion from the middle an inferior Part of the *Occiput* to the ſame Pa of the *Os Frontis*; but the other tranſverſe from two circular Ducts round each Ear ſo as to interſect the former on the *Sinciput* then begin at the Concourſe of the Angles and take heed, as you are clearing the Fore head, not to raiſe the *Frontales*.

The *Muſculus Occipitalis*, and its Fellow are very exactly deſcribed by *Fallopius*, bein ſhort and broad, but thin and fleſhy Mu cles ſeated on the *Occiput*, whence they a called the *Occipitales*. They have their Ri fleſhy from that Part of the *Os Occipu* whi

here the *Maſtoidæus* and the *Muſculus Splenius* have their Inſertions, and from becoming Tendinous they are conjoin'd with the *Pericranium*, which cloſely adheres to the Hairy Scalp on the *Sinciput*. Their Office is to pull the Hairy Scalp backwards.

The *Muſculus Frontalis* has its Riſe thin, broad and fleſhy on the ſuperior Part of the *Os Frontis* near the coronal Suture, and deſcending by the poſterior and fore Part of the *Temporalis*, is met by its Fellow near their Inſertions to the Skin of the Eyebrows.

Their Action and Uſe is to draw up and corrugate the Skin of the Forehead; they can't antagonize the forementioned Muſcles, (as ſome are of Opinion they do) becauſe their Originations are from the Bone above, and their Inſertions in the Skin of the lower Part of the Forehead.

Coiterus has beſides theſe invented another Pair, which by thoſe that follow his Footſteps are call'd *Corrugatores*, and ſaid to ariſe near each great Angle of the Eye at the *Puncta Lacrymalia*, ſeeming to be inſerted about the Middle-Part of the Eyebrows: But I am rather inclined to agree with thoſe that take them to be only two obſique Elongations of the preceding Muſcles.

The Muſcles of the Face being the next that are to be diſcovered, you muſt continue your former Diviſion from the Ridge of the Noſe, where you left off before, to the Tip of the Noſe. From two ſemicircular Sections on each Side the *Alæ* of the Noſe to the *Septum Narium* make a direct one, to join with a circular Inciſion about the Lips, and from the Middle of that of the under Lip draw your Knife in a direct Line over the Chin, Neck and *Sternum*, till you meet that longitudinal Section made before in the Diſſection of the Muſcles of the lower Belly. You may beſt free the Eyelids from the Skin, after you have raiſed it from the circumjacent Parts. But whilſt you are doing this, you muſt take heed not to wound the *Orbicularis Palpebrarum*; as alſo when you are raiſing the Skin of the Face and of the Neck, not to raiſe the *Quadratus Cenæ* with it.

CHAP. VII.

Of the Muſcles of the Eyelids.

THE Ancients, as well as *Veſalius*, were much miſtaken in their Notions of theſe Muſcles; for they divided the *Orbicularis* into two, whereby they ſuppoſed all the Motions of the Eyelids were performed. But this Error has been diſcovered ſince by *Fallopius*, who in the Diſſection of a Sea-Calf obſerving four Muſcles latent in the Orbit, inſerted above, underneath, and on both Sides of the Eyelids, made afterwards the ſame Enquiry in Man, in whom he happily diſcovered the *Aperiens Palpebram Rectus*, notwithſtanding which there are ſome modern Authors who retain the former Diſtinctions of the *Semicircularis Superior* and *Semicircularis inferior*.

The *Orbicularis Palpebrarum* is a thin fleſhy Muſcle, the Fibres whereof to encircle the Eyelids, and are inſerted to them (like the *Sphincter Labiorum*) without being conjoin'd with any Bone, from whence we may derive their Riſe, except the ſuperior Part of the Bone of the Noſe, reckoned by ſome the fourth Bone of the *Superior Maxilla*.

This Muſcle performs his Office like the *Sphincters* of other Parts, *viz.* by Conſtriction of the Eyelids. *Riolan* mentions beſides theſe, another Muſcle of the Eyelids, unto which he has given the Name of *Cilians*; but this I account only to be a Portion of the former next adjacent to the *Cilia*.

For the Diſcovery of the following Muſcle, that Part of the former which is placed betwixt the upper Eyelid and Eyebrow muſt be raiſed, and then the *Glandula Lacrymalis* with part of the Fat within the Orbit removed, by extending the upper Eyelid either with a Hook or with your Fingers, its tendinous Inſertion and fleſhy Body will come unto your View.

The *Aperiens Palpebram Rectus* has obtained its Denomination from its ſtreight Progreſs and Uſe. Its Origination is ſharp and fleſhy from the deepeſt Part of the Or-

bit, near the Place where the optick Nerve takes its Paſſage, and ſtretching directly over the *Muſculus Attollens*, it becomes Tendinous as it paſſes over the Ball of the Eye; whence it grows ſtill broader, but thinner, till it is inſerted to the whole ſuperior Part of the Eyelid.

The Muſcles of the Eyelids being removed, you muſt proceed to thoſe of the Eye it ſelf. *Fabricius ab Aquapendente* has left us Two different Methods in the Demonſtration of them; the One to repreſent the Eye with its Muſcles in its proper Situation; the Other, after the Eye is taken out of the Orbit, and the Muſcles expanded on a Table: The Firſt is intended chiefly to ſhew their Motions, and the Second their Figure. In the firſt, *Aquapendens* takes out the Brain, and divides the Bones of the Orbit; but I perform the ſame Operation without that trouble, thus: After you have taken off both the Eyelids, feel gently with your Finger for the *Trochlea*, ſeated near the Edge of the Orbit towards the Noſe, then clear the Tendon that paſſes thro' it. This done, clear in the ſame Manner its oppoſite Muſcle, to wit, the *Obliquus inferior*, and obſerve its Origination at the Edge of the inferior Part of the Orbit, and by the Help of a ſmall Hook and Sciſſars extract the fat Membranes and Veſſels from between the Muſcles.

The ſecond Method of Demonſtration may be in the ſame Eye, or elſe in the Oppoſite, but be careful whilſt you are ſeparating the *Trochlea* from the Orbit not to wound the Tendon which paſſes thro' it. The *inferior Obliquus* being cut off cloſe from its Origination, as likewiſe the reſt of the Muſcles and optick Nerves at the deepeſt Part of the Orbit, and the whole Eye taken out, diſengage its Muſcles and lay them out, when you will find the *Trochlearis* or *Obliquus Superior* to be the longeſt Muſcle of the Eye, and its Inſertion directly behind the *Attollens*; as on the Contrary, the *Obliquus inferior* is the ſhorteſt, whoſe Inſertion is directly behind the *Abducens*, whereby you may diſtinguiſh them.

CHAP. VIII.

Of the Muſcles of the Eye.

Columbus erroneouſly ſuppoſes the *Trochlearis* to belong to the Eyelid, and makes the Origination and Inſertion of the *Obliquus inferior* in the *Cornea* of the Eye; but *Fallopius*, the firſt Diſcoverer of the *Trochlea*, has given us the moſt accurate Deſcription of theſe Muſcles.

The *Obliquus Superior* or, *Trochlearis*, has obtained its Name from its oblique Situation and Progreſs, in reſpect to the reſt of its Fellows. The Second it derives from that cartilaginous Ridge, ſuſpended near the Edge of the ſuperior Part of the Orbit towards the Noſe thro' which its Tendon paſſes, being reflected on it like a Rope on a Pulley; it is alſo called the *Longiſſimus* of the Eye, becauſe it exceeds the others in Length.

Its Riſe is ſharp and fleſhy from the deepeſt Part of the Orbit, near the Origin of the *Abducens*, and with a fleſhy Belly paſſing obliquely cloſe under its ſuperior Part, forms a round Tendon ſtretching thro' the *Trochlea*, from whence reverting back it has its Inſertion to the *Tunica Sclerotis*, in the Middle of the Interval between the Termination of the *Attollens* and the optick Nerve, towards the back Part of the Bulb of the Eye.

The *Obliquus inferior* or *Breviſſimus Oculi*, from its being the ſhorteſt Muſcle of the Eye, ariſes ſharp and fleſhy from immediately within the lower and almoſt outward Part of the *Orbit*, at the Connexion of the firſt Bone of the upper Jaw with the fourth. It grows thicker as it aſcends obliquely over the *Deprimens*, and becomes tendinous at its Inſertion to the *Tunica Sclerotis*, near the Inſertion of the former, directly betwixt the *Abducens* and the optick Nerve.

Theſe two foreſaid Muſcles are called alſo the *Circumagentes* and *Amatorii*, from their Action in rowling the Eyes about: But the Authors don't very well agree in aſſigning the true Uſes of them; for ſome are of Opinion, that when the Superior

exert

rts its Function the Eye is rowled from the ſe, and when the Inferior, to it; whereas ers aſſert the Contrary, *viz.* that the mer moves it towards the Noſe, and the er from it or to the leſſer Angle of the e.

But if we reflect rightly upon the Poſi- n of the *Trochlea*, which determines the tion made by the *Superior Obliquus* and Origination of the *Inferior*, and that the ndon of the former and the whole *Ductus* the latter paſs obliquely from the exter- Brink of the *Orbit* to their Inſertions at back Part of the Bulb of the Eye, we ll find the vulgar Notions of their Mo- ns to be falſe. For when the ſuperior *liquus* acts, the back Part of the Bulb of Eye muſt draw near to the *Trochlea*, ereby its Globe is not only brought mewhat forwards, but its *Pupil* alſo di- ted downwards.

Thus on the Contrary, when the *Obli- inferior* is put in Action, the poſterior t of the Bulb of the Eye is moved to- ds the external Brink of the inferior Part the *Orbit*, and its Pupil directed up- ds, and the whole Globe drawn ſome- t outwards, ſo that the Bulb of the is more protuberant in theſe Actions; ch Mechaniſm was very neceſſary, ſince hout it the Projections of the Eyebrows Cheeks might impair our Proſpect di- ly upwards or downwards.

ut they have beſides theſe ſtill a more rkable Uſe, not only in pulling the directly forwards, but alſo by holding om being retracted, when any of the four *ght Muſcles* are in Action, which otherwiſe ld rather draw it inwards, then turn it er Sideways, or upwards or downwards. theſe Muſcles, one of them deſcending ardly from the uppermoſt, and the o- aſcending from the lowermoſt Brink he *Orbit* to their Inſertions, do prevent being retracted. The reſt of the Muſ- of the Eye have received the Denomi- on of the *Recti*, from their ſtreight Pro- s and Uſe.

he *Elevator Oculi* is called alſo the *Su- s*, becauſe haughty People look high as ppoſite Muſcle is called *Humilis*, tho' *ntinus* attributes the Motions relating to theſe Diſpoſitions to the upper Eyelids. This Muſcle has its Riſe ſharp and fleſhy near that Place where the optick Nerve has its Progreſs into the *Orbit*, and growing into a fleſhy Body ends in a thin Tendon, having its Inſertion to the *Tunica Sclerotis* on the ſuperior and anterior Part of the Bulb of the Eye under the *Adnata*.

The *Depreſſor Oculi* has its Riſe like the former from the deepeſt Part of the *Orbit*, and like it paſſes alſo directly to the oppoſite Part of the Globe of the Eye, where it has its Inſertion,

The *Adductor Oculi* is ſo called, becauſe it inclines the *Pupil* of the Eye towards the Noſe; it is called alſo *Bibitorius*, becauſe it moves the Eye towards the Cup. Both its Origination and Progreſs is like the two former, and its Inſertion to that Part of the *Tunica Sclerotis*, which borders on the Noſe.

The *Abductor Oculi* has obtained its Name from his Action in retracting the Eye from the Noſe, it is therefore alſo called the *Indignabundus*. This Muſcle has its Riſe like the three next preceding, where the Optick Nerve has its Ingreſs, and its Inſertion like them alſo in that part of the *Tunica Sclerotis* that reſpects the ſmall Angle of the Eye, oppoſite to the Implantation of the former.

When theſe four Muſcles are in Action together, they draw the whole Globe of the Eye backwards into the *Orbit*, from whence it is moved forwards again by the two before-mentioned *Obliqui*.

Mullinete, with ſome of his Followers, adds another called by them the *Muſculus rectus quintus*, the Office of which they confine to the Motion of the *Trochlea* (ſuppoſing it moveable); but what has been alledged by the ſaid Author, either concerning its Exiſtency or Uſe, is ſo obſcure and full of Contradictions, that I judge it not deſerving any Place here. And as I never could find out any ſuch Muſcle by Diſſection, I ſuppoſe he miſtook that Part of the *Orbicularis Palpebrarum*, which adheres to the *Trochlea*, for a peculiar Muſcle.

CHAP.

CHAP. IX.

Of the Muſcles of the Noſe.

THE Noſe being altogether immoveable, except in the *Alæ* or lower griſtly Parts, theſe by their Approach or Receſs cauſe a Conſtriction or Dilatation in the Noſtrils. *Galen* ſpeaks only of one Pair of Muſcles belonging to them, to which *Carpus* and *Veſalius* add another, having its Riſe at the Extremities of the Bones of the Noſe, and their Inſertion in the interior Side of the *Alæ*. *Columbus* aſcribes thoſe mentioned by *Galen* to the upper Lip, adding that thoſe ſaid to be ſeated at the Inſide of the Noſe are fictitious; but in lieu thereof, gives us a Deſcription of another Pair, ariſing from the ſuperior Parts of the Bones of the Noſe, which have their Inſertions to the *Alæ*. *Fallopius* ſeems to be dubious as to thoſe Muſcles mentioned by *Carpus* and *Veſalius*, but Mr. *Bueſſier*, a moſt accurate Anatomiſt, tells me, that he has frequently obſerved them; and ſays further, that thoſe mentioned by *Columbus* do not belong properly to the *Alæ* of the Noſe, but are Parts of the *Orbicularis Palpebrarum*. *Fallopius* gives us alſo a Deſcription of another Muſcle, whereof he was the firſt Diſcoverer, called by the more modern Anatomiſts the *Conſtrictor Alæ Naſi*. I intend, in the Deſcription of theſe Muſcles, to follow the Order of *Riolan* and others, who diſtinguiſh them into *Proper* and *Common*.

The *Proper* are thoſe which move the *Alæ* only, as the *Dilatores Alarum Naſi*. The *Common* are thoſe which move the *Alæ* together with the other Lip, as the *Retractores* and *Conſtrictores Alarum Naſi*.

The *Dilatores Alarum Naſi* are ſmall thin Muſcles with a double Series of Fibres, decuſſating one another like the *Muſculi Intercoſtales*. They have their Riſe at the inferior and interior Parts of the *Oſſa Narium*, and their Inſertion at the upper Parts of the *Alæ*. Their Office is to pull up the *Alæ* and dilate the Noſtrils, but believe they are not extant in all Subjects.

The *Retractores Alarum Naſi & Elevatores Labii Superioris*, ariſe broad and fleſhy from the fourth Bone of the upper Jaw, whence deſcending obliquely, they have their Inſertions in the upper Lip and the *Alæ Naſi*.

The *Conſtrictor Alæ Naſi*, mentioned by *Fallopius* and *Placentinus*, I ſuppoſe to be fictitious.

The *Conſtrictores Alarum Naſi & Depreſſores Labii Superioris*, have their Riſe fleſhy from the anterior Parts of the fourth Bones of the *Superior Maxilla* immediately above the Gums of the *Dentes Inciſivi*, and their Inſertions at the Roots of the *Alæ Naſi* and the ſuperior Parts of the upper Lip.

In their Action they pull the upper Lip and *Alæ* downwards, and thus draw the *Alæ* nearer together, as may be obſerved in the Reception of odoriferous Scents.

CHAP. X.

Of the Muſcles of the Cheeks and Lips.

THeſe Muſcles are diſtinguiſhed into thoſe that are either *Common* to the Cheeks and Lips, or elſe to both Lips, or *Proper* to the upper or under Lip only.

The *Common* to the Cheeks and Lips are two Pair, *viz.* on each Side two Muſcles call'd the *Quadratus* and *Buccinator*.

The *Quadratus Genæ ſeu Tetragonus*, call'd by *Galen* the Muſcular Expanſion, is a large ſquare Muſcle, placed under the Skin of the Neck, and expanded over the whole inferior Part of the Face. Its Origination is thin and Membranous from the Spines of the *Vertebræ* of the Neck; it ariſes alſo from the Skin on the upper Part of the *Cucullaris* and pectoral Muſcle, from hence aſcending under the Skin of the Neck becomes fleſhy and one Part of it adhering to the *Os Hyoides* has its Inſertion at the middle of the *inferior Maxilla*; the other being broader proceeds further to its Inſertion in the Cheeks below the Angle of the Lips.

In the joint Action of both theſe Muſcles, they draw downwards each Angle of the Mouth downwards, together with the Cheeks, as is to be obſerved in thoſe that look with a ſorrowful Countenance. But when the inferior Parts of theſe Muſcles (being placed on the Neck) are put in Ac-

only, they diſtend the ſuperjacent Skin, making it approach to a direct Line with Clavicles and lower Jaw-bone, which herwiſe is indented according to the Formation of the Part, and ſo make what we ll a double Chin.

The *Buccinator* has received its Name, beuſe in Trumpeting it forces out the Breath. has not its Riſe from the Gums of the pper, and its Termination in thoſe of the nder Jaw, nor is of that Figure as ſome natomiſts have deſcribed it, nor interwon with various *Series* of Fibres as ſome hers will have it; but ariſes broad and eſhy from the anterior Part of the *Proceſſus ona* of the *inferior Maxilla*, and from ence proceeding with direct Fibres it heres to the Gums of both the *Maxillæ*, d has its Inſertion to the Angle of the ips.

Through the Middle of this Muſcle the *ctus ſalivalis Superior*, call'd the *Vinculum buſtum* by *Placentinus*, takes its Paſſage.

Its Uſe, beſides that in Trumpeting, is to aw the Lips or Mouth on one Side.

The Muſcles that are *Common* to both Lips ve their Inſertions into the Angles of the outh, and are the *Zygomaticus*, *Elevator*, *preſſor*, and *Conſtrictor Labiarum*.

The *Zygomaticus* has received his Name om the *Os Jugale* or *Zygoma*, where it has Origination, which is round and fleſhy om the exterior Part of the ſaid Bone, ence deſcending forwards it has its Inſerton near the Angle of the Lips.

The Action of this Muſcle, in conjunctiwith its Fellow, is to draw both Lips wards, as we obſerve it in a pleaſing ountenance.

The *Elevator Labiorum* is ſituated betwixt next preceding Muſcle, and the *Elevaor Labii Superioris Proprius*. It has its Riſe om the fourth Bone of the *Superior Maxilla*, and deſcends directly to its Inſertion der the Termination of the preceding.

The *Depreſſor Labiorum* ariſes fleſhy from lower Edge of the *inferior Maxilla* lately, and aſcends directly to its Terminaon at the Angle of the Lips. This Muſcle th its Fellow, and the *Quadrati*, draw the rners of the Mouth and Cheeks downrds, as is obſervable when we make a rowful Face.

The *Conſtrictor Labiorum* with the *Sphincter*, and *Orbicularis Labiorum*, embraces the Lips with Orbicular Fibres, and in its Action draw it together like a Purſe, whence ſome have called it alſo the *Oſculatorius*.

There are three Pair of Muſcles *proper* and *peculiar* to the upper and under Lip, *viz.* the *Elevatores Labii Superioris*, and the *Depreſſores* and *Elevatores Labii inferioris*.

The *Elevator Labii Superioris* has its Riſe fleſhy from the anterior Part of the fourth Bone of the *Superior Maxilla* immediately above the *Elevator Labiorum*, treated of before, and deſcends obliquely under the Skin of the under Lip joining with its Fellow in a middle Line, from the *Septum Narium* to its Termination in the *Sphincter Labiorum*.

The *Depreſſor Labii Inferioris* is placed betwixt the *Depreſſores Labiorum Communes*, before deſcribed, occupying that Part of the *inferior Maxilla* called the Chin, and aſcending with a direct and tranſverſe *Series* of Fibres, has its Inſertion into the under Lip; in depreſſing of which it turns it outwards. It is hard to determine, whether it be one or two Muſcles.

The *Elevator Labii Inferioris*, with its Fellow, is placed within the under Lip. Theſe I firſt obſerved ſome time ſince. They have their Originations fleſhy from the inferior Part of the Gums of the *inferior Maxilla*, which belong to the *Dentes Inciſivi*, and deſcends directly to their Inſertions into the inferior Part of the Skin of the Chin; when they act, they produce divers Indentations in the Chin, as may be obſerved in living Perſons when the under Lip is drawn upwards.

CHAP. XI.

Of the Muſcles belonging to the Auricula *or the External Ear.*

FAllopius, the firſt Diſcoverer of theſe Muſcles, fails us. There are ſometimes found three appertaining to each *Auricula*, *viz.* the *Attollens*, the *Deprimens*, and the Third which is a Portion of the *Tetragonus*, but adds, that they are ſometimes wanting alſo. *Placentinus* has made five of them; but

but Monſieur *de Verney*, in his moſt excellent Treatiſe of the Ear, with much more Thought has given us the Deſcription only of two of them, *viz.* the *Attollens*, and *Retrahens*.

The *Attollens Auriculam* is compoſed of divers carneous Fibres, and annexed to that Part of the *Pericranium* that covers the Temporal Muſcle, whence it deſcends directly to its Inſertion at the ſuperior Part of the ſecond Wrinkle of the Cartilage of the Ear.

Its Uſe is agreeable to its Name.

The *Retrahens Auriculam*, called alſo the *Triceps Auris*, becauſe it is found ſometimes with three Originations. The foreſaid Monſieur *de Verney* ſays, it conſiſts of five or ſix fleſhy Fibres, which have their Beginning at the ſuperior and anterior Part of the *Proceſſus Maſtoides*, and deſcend obliquely to their Termination in the Middle of the *Concha Auriculæ*.

N. B. The Muſcles of the internal Ear cannot be demonſtrated till after all thoſe belonging to the Head are diſpatched, and the Brain removed; yet we will give their Deſcription in this Place, it being Cuſtomary alſo at the Lectures of Chirurgeons-Hall to ſhew them in a dried Preparation.

CHAP. XII.

Of the Muſcles of the Internal Ear.

THE Muſcles belonging to the Internal Ear were altogether unknown to the Ancients, *Barthlomæus Euſtachius* being the firſt who has left us an exact Deſcription of the moſt Internal of thoſe belonging to the *Malleus*, whence it is called the *Internus Auris*. *Coiterus* ſpeaks of two Muſcles ſituated on the ſecond *Meatus* or *Concha*, commonly called *Timpanum*; but as he has given us no Deſcription of them, and his Obſervations were taken from *Brutes*, 'tis very probable that one of them was the ſame internal Muſcle mentioned by *Euſtachius*, and the other the *Muſculus Stapedis*.

Aquapendens and *Placentinus* contend for the Diſcovery of another ſituated in the *Meatus* and *Iterius*, called the *Externus*, in the Deſcription of which they are followed by moſt Anatomiſts, except Monſieur *du V[erney]*, who gives us a Deſcription fou[nd] upon his own Diſſection of two M[uſcles] belonging to the *Malleus*, wherein, with[out] taking Notice of the *Muſculus Extern[us] Aquependens* and *Placentinus*, he ſubſtitu[tes] another in lieu thereof, unto which he [has] given the Name alſo of *Externus*, bec[ause] its Situation is on the external oſſeous P[art] of the *Ductus* leading from the Palate to [the] Ear, which I have called the *Obliquus A[uris]* from its Poſition. So that there are th[ree] Muſcles appertaining to the *Malleus*; and which, the Firſt that appears is the *Extern[us]* of *Aquipendens*, the Second is the *Ex[ternus]* of Monſieur *de Verney*, and the Th[ird] the *Internus* deſcribed by *Euſtachius*; u[nto] which you may add the Fourth belong[ing] to the *Stapes*, called the *Muſculus Stapedis* diſcovered in Brutes by *Placentinus*, and [in] Man by Monſieur *du Verney*.

When you propoſe to make a Demo[n]ſtration of theſe Muſcles, you muſt (af[ter] the Diſſection of the Brain, or all the Mu[ſ]cles which have their Originations from [the] Inſertions to the *Baſis* of the Skull) ſepa[rate] the *Os Temporum* with Part of the *Os Sp[he]noides* of one Side, and the *Occiput* on t[he] other, from the reſt of the Bones (after its b[e]ing well cleared of the Muſcles, Membra[nes] and Veſſels that are remaining on it) a[nd] by the Help of a ſmall Semicircular Chi[ſel] cut away the inferior Part of the *Me[atus] Auditorius*, but ſo as not to wound t[he] *Tympanum*. This done, you muſt with [a] great deal of Circumſpection and C[are] raiſe the glandulous Membrane wherew[ith] the *Meatus* is inveſted, to which the exte[r]nal Muſcle does adhere.

The other two Muſcles being inclo[ſed] within the *Os Petroſum*, you muſt firſt o[b]ſerve the laſt named Bones Connexion wi[th] the *Os Sphænoides*, and here with the Chi[ſel] lightly cut off their anterior *Laminæ*, a[nd] ſo the oblique *external* Muſcle of Monſ[ieur] *du Verney* will make its Appearance, tog[e]ther with the *Internal* of *Euſtachius*. And [if] you cut and break off more of the *Os P[e]troſum*, there will not only appear to yo[ur] View the oſſeous Part of the *Aqueduct*, b[ut] the Articulation alſo of the *Malleus*, w[ith] the *Incus* and the Cavity of the *Tympa[num]*. Here you may take notice of the ſo[ur]

ocess of the last named Bone, conjoin'd th the *Os Orbiculare* and *Stapes*, and the ndon of the *Musculus Stapedis* running t of a Perforation of the *Os Petrosum* wn to its Insertion in the Head of the pes, together with the anterior Surface of *Membrana Tympani*, and the long Pro- s of *Malleus* resting on it.

The *Externus Auris vel Laxator Externus* situated in the superior Part of the *Mea- auditorius*, having a short fleshy Body, and long slender Tendon. Its Rise is at the erior and superior Edge of the *Meatus ditorius*, and soon becoming a slender ndon, stretches directly upwards to the mbrane of the *Tympanum*, on which it scends for some Space to its Insertion in longer Process of the *Malleus*, where it contiguous to the said Membrane. Its e is to draw the Handle of the *Malleus* gether with the Membrane of the *Tympa- m* forwards.

The *Obliquus Auris* may be called *Semicir- aris* also from its Situation, which is on exterior Parts of the Osseous Channel of Aqueduct, whence being extended newhat upwards and backwards, it en- s the *Tympanum* in a very oblique Sinuosi- excavated above the Bone immediately here the *Tympanum* is inchased, and has Insertion into the small *Apophysis* of the *alleus*. The Sinuosity in which this Mus- passes, may be taken notice off in the perior Part of the Osseous Circle of the *tus*. *Du Verney* is the First who has left a Description of this Muscle.

The *Internus Auris* has its Situation in an seous Channel excavated in the *Os Petro- e*, which forms one of the *Parietes* of the *mpanum*. One Part of this Channel is thout the *Tympanum*, *viz.* In the superior rt of the Osseous Passage, which goes m the Ear to the Palate; but the other rt which is within the *Tympanum*, stretch- g as far as the *Fenestra Ovalis*, makes in t Place a Protuberancy, upon which as a Pulley the Tendon of this Muscle ses to the other Side of the *Tympanum*, d has its Insertion at the posterior Part of Handle of the *Malleus*, a little below Termination of the external Muscle, d so draws it towards the *Os Petrosum*. is Muscle has its Rise exactly in that Place where the Osseous Part of the Aque- duct ends, and is covered with a nervous Coat which forms a Sheath, accompanying it in its whole Progress, and tying it fast to the Channel.

The Use of this Muscle is in its Action to draw the Handle of the *Malleus* towards the *Os Petrosum*, whereby the Membrane of the *Tympanum* becomes somewhat Concave on the exterior Side.

Shelhamer says he has observed a small Bone in the Tendon of this Muscle in some Animals, which I am apt to believe he mistook for the Tendon of the Muscle of the *Stapes*, in which Dr. *Adair*, a very curious Anatomist, lately communicated such an Observation to me made by him in a Calf's Head, where it appear'd annexed to the *Stapes*, and resembling in Figure the *Os- culum quartum* of *Sylvius*; but if you be ex- act in your Enquiry, you may meet with both in the same Organ, the latter com- monly remaining on the long Process of the *Incus*, when separated; but if you leave the *Stapes* in its natural Position, you may then discover in that Animal the Origina- tion, Progress and Insertion of its Muscle, together with the said Bone in its Tendon, as it passes over a Projection of the *Os Petro- sum*, which composes the *Foramen Rotundum*, on which I suppose the Tendon of this Muscle moves like as on a *Trochlea*, for that small Bone is placed not unlike the Knee- pan of the Knee, and the *Ossa Sesamoidea* of the Feet.

The *Musculus Stapedis* lies latent in an Osseous Pipe, excavated in the *Os Petrosum* almost at the Bottom of the *Tympanum* where it has its Rise. Its Belly is big and fleshy, and it soon forms a very thin Tendon, which descending, is inserted to the Head of the *Stapes*. The Pipe in which this Muscle is lodged is of the Length of about a sixth Part of an Inch, and is much larger than the *Foramen* thro' which its Tendon passes.

The Use of this Muscle is to draw the *Stapes* upwards to the *Foramen Ovale*.

The true Method of Dissection brings us to the Muscles of the *Os Hyoides*; for which end the *Mastoidei* must be raised on each Side of the Neck, so as that one of them be cleared from its Origination, and left at its Insertion; and the other on the Contrary

be raiſed from its Termination, and left at its Origination.

After this, the *Digaſtrici* of the *inferior Maxilla* may be taken notice of in their whole Progreſs, where you may obſerve, that they deſcend from their Originations thro' the *Stylo Hyoides* to the *Os Hyoides*, where an *Annulus* is made on both Sides for the Paſſage of their middle Tendons, after which they reaſcend for their Inſertion. Theſe being alſo raiſed contrariwiſe like the *Maſtoidæi* and the Perforations of the *Stylohyoidæi* enlarged, thro' which each contrary End of theſe muſt be drawn, leaving the one at its Origination, and the other at its Implantation, till we come to the Deſcription of the reſt of the Muſcles that move the *inferior Maxilla.*

CHAP. XIII.

Of the Muſcles belonging to the Os Hyoides *or the Bone of the Tongue.*

THE Bone of the Tongue being faſtened to the Tongue and *Larynx*, the Muſcles which move it muſt be accounted *common* to both.

Veſalius, *Columbus*, *Spigelius*, *&c.* reckon four Pair of them, *viz.* the *Par Sternohyoidæum*, *Caracohyoidæum*, *Stylohyoidæum*, and *Geniohyoidæum*, unto which *Fallopius* adds a fifth Pair, called by the later Authors the *Par Mylohyoidæum.*

All theſe Muſcles of the *Os Hyoides*, have obtained their Names from their ſeveral Originations and Inſertions.

The *Sternohyoidæus* has not its Riſe from the ſuperior Part of the *Sternum*, as it is generally given out, but at the interior Part of the Clavicle, where its Origine is broad and carneous; and aſcending directly of an equal breadth and thickneſs over the *Sternothyroidæus* and *Larynx*, is inſerted at the *Baſis* of the fore Bone of the *Os Hyoides.*

In the Action of this Muſcle with its Fellow, the *Os Hyoides*, together with the Tongue and *Larynx*, is pull'd directly downwards.

The *Coracohyoidæus* does not ariſe from the Proceſs *Coracoides* of the *Scapula*, as it has been commonly repreſented; but its Origine which is round and fleſhy is at the *Superior Coſta* of the *Scapula*, at the Root of the ſaid *Apophyſis*, whence ſtretching directly under the *Maſtoidæus* it grows Tendinous, but becoming fleſhy again, has its Inſertion into the *Baſis* of the fore Bone of the *Os Hyoides* near the Termination of the next preceding Muſcle.

This *Muſcle* paſſing under the *Maſtoidæus* as on a *Trochlea*, it there grows Tendinous not unlike the *Digaſtricus* of the lower Jaw, and thence is called alſo *Biventer* by ſome Anatomiſts.

When this Muſcle acts in conjunction with its Fellow, they are not only Aſſiſtants to the former in drawing the *Os Hyoides*, the Tongue and *Larynx* downwards; but they alſo draw them ſomething inwards towards the *Vertebræ* of the Neck.

The *Stylohyoidæus*, called alſo the *Styloceratohyoidæus*, becauſe its Implantation is found to be in the *Cornua* of the *Os Hyoides.* It has its Origination, ſharp and fleſhy at the *Apophyſis Styloides*, and ſoon becoming larger, deſcends obliquely forwards to the *Os Hyoides.* At the middle Way of its Progreſs thither its fleſhy Body is divided, to give Paſſage to the middle Tendon of the *Digaſtricus* of the inferior *Maxilla.* This Muſcle is well expreſs'd *inſitu* by *Bidloe.*

When this is put in Action in conjunction with its Companions the *Styloglossus* and the *Stylopharyngæus* on each Side, they draw up the *Os Hyoides*, Tongue and *Larynx*, together with the *Fauces* in Deglutition; ſo that the Aliments after previous Maſtication are not only thruſt into the *Fauces* (they being then dilated), but the *Epiglottis* as depreſs'd and adequately covers the *Rimula* of the *Larynx*, by its Approximation to it; by which Means, the Deſcent of the moſt minute Part of the Aliments into the Wind-Pipe is prevented by a moſt admirable Contrivance of Nature.

The *Mylohyoidæus* ſeems not to be diviſible, tho' *Fallopius* makes it a Pair of Muſcles; it occupies all that Space which is betwixt the *inferior Maxilla* and the *Os Hyoides.* Its Origination is fleſhy from both Sides of the Mandible, at the interior Side near the *Dentes Molares*, whence extending with a double *Series* of fleſhy Fibres, the outward-moſt of them run directly to their Inſertion

n the *Os Hyoides*, and the Middle do ſtretch ranſverſely over the following Muſcles, eing inſeparably conjoin'd with one ano- her by a middle Line, as is well expreſs'd y *Bidloe*, *T.* 15. Beſides the Uſes general- known to belong to this Muſcle, *viz.* to ove the *Os Hyoides*, Tongue and *Larynx* pwards, forwards, and to either Side; the ſt mentioned tranſverſe *Series* of Fibres ave this further Uſe alſo, that they com- reſs the *Glanduli Sublinguales*, which have eir Situation immediately under them on ther Side, by which Means the Egreſs of e *Saliva* out of the inferior Salival Ducts to the Mouth is forwarded: So that theſe uſcles are put in Action (as in Deglutiion) when we want Spittle to moiſten the outh; and in that Action they furniſh e freſh Spittle to join with theſe Aliments hich require no Maſtication.

The *Geniohyoidæus* and its Fellow are ſhort, ick, and fleſhy Muſcles; they have their riginations at the interior Parts of the *ferior Maxilla* at the *Mentum*, and expand- g themſelves, are ſoon contracted again, d have their Inſertion into the upper Part the fore-Bone of the *Os Hyoides*.

In their Action they draw the *Os Hyoides* pwards and forwards, and are Aſſiſtant to e *Genioglooſſi* in thruſting the Tongue out the Mouth.

After all the Muſcles of the *Os Hyoides* are iſed from their Originations, and left at eir Implantations, the whole Bone may taken out with them, if you ſeparate its o Extremities from the two *Apophyſes* of e *Cartilago Scutiformis*, and cut off the O- gines of the *Ceratogloſſi* and *Hyothyroidei*. his done, they may be laid open upon a Table, as they are repreſented by *Caſſerius Placentinus*, and by *Veſlingius*, in their Figures; the latter of which calls the laſt deſcribed *Geneiohyoides*, and e preceding *Geniohyoides par internum*.

Lib. II. *ntag. A- t. Ch.* 11.

CHAP. XIV.

Of the Muſcles of the Tongue.

Ome Anatomiſts compute Eight, ſome Nine, and others Ten or Eleven belonging to the Tongue, and among theſe, reckon the Tongue it ſelf; but we intend to give you their Deſcriptions here, according as they have appeared in our Diſſections.

N. B. Theſe Muſcles have received their Denominations from their Originations and Implantations, and the Adminiſtration of them is not difficult, after you have made an exact Diſſection of the Muſcles belonging to the *Os Hyoides*.

The *Genioglooſſus*, together with its Fellow, are placed immediately under the next preceding *Geniohyoidæi*, having their Riſe fleſhy from the anterior Part of the *inferior Maxilla* on the interior Side, and expanding themſelves, are implanted into the Root of the Tongue.

In their Action they draw the Tongue forwards, and thruſt it out of the Mouth.

The *Ceratogloſſus* muſt be divided from its broad fleſhy Origination at the upper Part of the *Os Hyoides* laterally, whence it aſcends to its Implantation at the Root of the Tongue.

In the Action of this Muſcle with its Fellow, the Tongue is drawn directly into the Mouth; but if one of them acts only, it moves it to one Side.

The *Styloglooſſus* has its Origine ſharp and fleſhy from the *Apophyſis Styloides*, whence deſcending obliquely forward, it is implanted into the Root of the Tongue, juſt underneath the Inſertion of the next preceding.

Its Uſe is to pull the Tongue up and inwards in Deglutition.

Moſt Anatomiſts (except *Fallopius*) add unto theſe another Muſcle, called the *Baſiogloſſus*, and by ſome the *Hypſiloglooſſus*, having its Riſe from the *Os Hyoides*, and its Inſertion into the Tongue; but whether there be ſuch a Muſcle or not, has not as yet been diſcovered by our late Enquirers.

CHAP. XV.

Of the Muſcles of the Larynx.

THeſe Muſcles are diſtinguiſhed into *Common* and *Proper*.

The *Common* have their Riſe from either Parts, and their Implantations into the *La-*

rynx; concerning which, the Ancients computed three Pair, reckoning the *Oeſophagiæus* for one; but this has been ſince corrected by *Fabricius ab Aquapendente*, the *Oeſophagiæus* being but one ſingle Muſcle, appertaining to the *Gula*, ſo that there are no more than two Pair belonging to the *Larynx*, *viz.* the *Sternothyroidæus* and *Hyothyroidæus*.

But the *Proper* Muſcles belonging to the *Larynx* are theſe, whoſe Origine and Inſertion are confined to the Cartilages themſelves: *Aquapendens* has moſt accurately expreſs'd them in his Figures. There are four Pair of them, beſides one ſingle Muſcle, *viz.* the *Par Cricothyroidæum*, *Cricoarytænoidæum Poſticum*, *Cricoarytænoidæum Laterale*, *Thyroarytænoidæus*, and the *Arytænoidæus*.

All theſe Muſcles have received their Names from their Originations and Implantations.

The *Sternothyroidæus* has its Riſe fleſhy and broad from the ſuperior and anterior Part of the *Sternum*, whence aſcending on both Sides of the *Arteria Aſpera* over the *Glandulæ Thyroidei*, it has its Inſertion at the *Cartilago Thyroides* or *Scutiformis*.

This Muſcle, in Conjunction with its Fellow, draws the *Larynx* downwards, and lengthens the *Canalis* or Diſtance between the *Rimula* and Tip of the Tongue, which being the true *Plectrum Vocis*, thereby the Sound of the Voice is rendred grave.

The *Hyothyroidæus* has its Origination fleſhy, from the lower Part of the *Os Hyoides* laterally, oppoſite to the Origin of the *Ceratogloſſus*, and deſcends directly to the inferior Part of the *Cartilago Scutiformis*, near the Inſertion of the next preceding.

This Muſcle, in Conjunction with its Fellow, pull the *Larynx* upwards in an acute Tone of the Voice, the Canal of the Wind-Pipe being alſo ſtreightned thereby.

The next in Courſe, are the *Proper* Muſcles belong to the *Larynx*.

In their Adminiſtration, clear the *Muſculus Oeſophagiæus* from either Side of the *Cartilago Scutiformis*, and divide the *Arytenoidal* Cartilages from the *Glottis*, as likewiſe ſeparate the Wind-Pipe from the *Gula*: Cut off the former near the *Bronchia*, and the Diſſection of the ſubſequent Muſcles will ſucceed the better.

The *Cricothyroidæus*, is a ſhort, thin, fleſhy Muſcle, ſituated on the anterior Part of the *Larynx*; its Riſe is at the anterior Part of the *Cricoides*, whence ſtretching directly, it is ſoon implanted into the *Scutiformis* internally laterally.

Galen and *Veſalius* makes this two Muſcles; but when you ſeparate the inferior Proceſſes of the *Cartilago Scutiformis* from the *Annularis*, you will meet only with one on each Side, as *Aquapendens* has very well obſerved. The Origination and Implantation of this Muſcle is ſaid by ſome to be *Contrario*, *viz.* That its Uſe is rather to pull up the *Annularis*, than to draw downwards the *Scutiformis* nearer it. But this Diſpute is of little Weight, ſince all the Muſcles do move the Parts leſs ſtable to thoſe more fix'd, as is inſtanced in the *Recti Abdominis*, after *Spigelius*, *Chap.* 1. *pag.* 26.

The *Cricoarytænoidæus Poſticus* has its Situation at the poſterior Part of the *Larynx*. It is of a quadrangular Figure, having its Origination from the back Part of the *Cartilago Annularis*, and fills up a ſuperficial Depreſſure of it with Fibres, aſcending obliquely outwards to their Implantation at the lowermoſt Part of the *Arytenoidal* Cartilage.

The Uſe of this Muſcle, together with its Fellow, is to open the *Rimula*, which you may plainly diſcover, if with your Knife you repreſs this Muſcle, the *Arytænoidal* Cartilage will be opened thereby.

The *Cricoarytænoidæus Lateralis*, is a ſmall, ſhort, and fleſhy Muſcle, having its Origination from the *Cartilago Cricoides* laterally, and aſcending obliquely, has its Inſertion into the *Arytenoidal* Cartilage, near the Inſertion of the former Muſcle.

The Uſe of this Muſcle is to draw the *Arytenois* towards the Sides, and thereby to open the *Rimula*.

The *Thyroarytænoidæus* is the largeſt of all the *proper* Muſcles of the *Larynx*; it has its Riſe, together with its Fellow, in the interior and concave Part of the *Cartilago Scutiformis*, from whence they aſcend to their Inſertion to the anterior Part of the *Arytænoides*.

In their Action they approach to the Cartilages to which they are faſtened, and cloſe up the *Rimula*. The Contraction of theſe Muſcles, by an Inflammation in an *Angina*, produces ſudden Death.

The

he *Arytænoidæus* is the ſmalleſt among the Muſcles belonging to the *Larynx*; e will have it to be double, but I al- s found it ſingle. It has its Riſe from exterior Part of one of the *Arytænoidal* tilages, and running tranſverſely, its rtion is into the other.

he Uſe of this Muſcle, is to draw the *tilages Arytænoides* nearer each other, and ſhut the *Rimula* adequately; for the reſt, n't agree with what Dr. *Gibſon* relates of *Croon*'s Opinion, concerning the Uſe of e Muſcles.

CHAP. XVI.

Of the Muſcles of the Fauces.

iolan challenges the Diſcovery of theſe Muſcles, as well as thoſe of the *Gargare-* as his own, tho' their Deſcription was n before by *Fallopius*, under the general e of the Muſcles of the *Fauces*. Neither *Veſalius* nor *Columbus* as much as men- either of them, tho' the former were ly deſcribed by *Galen*, *Oribaſius* and *cen*. The modern Authors have follow- he erroneous Syſtem of *Riolan*, and in Confuſion of Opinions, we thought it niſite to give a Figure of our own of n, to render our Deſcription the more picuous and Intelligible.

he *Stylopharingæus* ariſes ſharp and fleſhy n the Root of the *Apophyſis Styloides*, ith the before deſcribed *Styloglosſus*) nce deſcending obliquely, it enlarges it at its Implantation into the interior ndulous Membrane of the *Fauces*, in the dle whereof it is conjoin'd with its Fel- .

n their Action they pull the *Fauces* up- ds, and dilate them in order to receive the ments after Maſtication in Deglutition.

hese being divided from their Origina- s, the next that come in View, are thoſe ch faſten this Part to the *Baſis* of the ll, and thoſe according to *Riolan* do con- of two Pair of Muſcles, but ſeem to us e but one Muſcle with two fleſhy Ori- , ariſing from the *Apophyſis Pterigoidæi*, which Reaſon we have given it the Name *Pterigopharyngæus*.

The *Pterigopharyngæus* has its Origination thin and fleſhy at both the *Proceſſus Pterigoidæi* of the *Os Cuneiforme*, as alſo at the Root of the Tongue, and the Extremities of the *Os Hyoides*; from theſe Places its fleſhy Fibres do run ſemicircularly, encompaſſing the ſuperior and poſterior Part of the glandulous Membrane of the *Fauces*, where they meet in a middle Line.

In the Action of this Muſcle, the Middle or back Part of the *Fauces* are brought to a Plain, ſo that the *Tonſilla*, as well as the reſt of the *Glandules*, are compreſs'd in the Evacuation of their *Mucus*, to join with the Aliments in their Deſcent into the Stomach by Deglutition, and at other Times to further *Secretion*, in which this Muſcle is the main Inſtrument: That the *Tonſilla* do approach towards each other, is obſervable, when we inſpect thoſe Parts in living Perſons.

The *Oeſophagus ſeu Sphincter Gulæ.*

This Muſcle ſeems to be no more than a Continuation of the next preceding, which having its Riſe from each Side of the *Cartilago Scutiformis* like it, proceeds to a middle Line on the back Part of the *Fauces*.

The Uſe of this Muſcle is to aſſiſt the next preceding, in compreſſing the Aliments after Maſtication into the *Gulæ*, but ſome aſſert to ſtreighten the *Cartilago Scutiformis*, and render the Sound of the Voice more acute.

Unto theſe we may add alſo the *Muſculus Perforatus Gulæ*, as it is call'd by Dr. *Willis*.

The *Vaginalis Gulæ* conſiſts, according to *Steno*, of a double *Series* of ſpiral Fibres, mutually intercuſſating each other. Dr. *Willis* attributes two Muſcles to the whole *Oeſophagus*, which he ſays, make four Parallelograms, with their oppoſite Fibres decuſſating each other. But it is obſerved otherwiſe in Man, in whom the Fibres of this Muſcle are Longitudinal and Oblique, the former take their Riſe at the *Arytenoidal* Cartilages, and proceeding obliquely to the back Part of the *Oeſophagus*, deſcend to the Stomach. The latter ſeem to be a Continuation of the laſt deſcribed of the Muſcles, deſcending obliquely in a ſpiral Manner, not unlike thoſe of the Inteſtines, as repreſented by Dr. *Cole*.

CHAP.

CHAP. XVII.

Of the Muſcles of the Gargareon.

THeſe Muſcles being firſt deſcribed by *Fallopius* amongſt thoſe of the *Fauces*, *Riolan* was the firſt who aſcribed them to this Part, and gave them the Names of *Pterigaſtophilinus internus* and *externus*, which Dr. *Croon* changed into thoſe of *Sphænopalatinus* and *Pterigopalatinus*, or *Sphænopterigopalatinus*; but he never propoſed a Third Pair as Dr. *Gibſon* has imagined.

The *Sphænopalatinus* deſcends from a round fleſhy Origin at an *Apophyſis* of the *Os Sphænoides*, which is in a direct Line betwixt the *Alæ Veſpertilianum* and the *Proceſſus Styloides*, becoming a round fleſhy Body in the middle Way of its Progreſs, grows leſs again near its lateral Implantation into the poſterior Part of the *Gargareon*.

In the Action of this Muſcle in Conjunction with its Fellow, the *Gargareon*, together with the *Uvula*, is pull'd upwards and backwards, which prevents the Aliments after Maſtication from regurgitating thro' the *Foramina Narium* in Deglutition.

The *Pterigopalatinus*, or *Sphænopterigopalatinus*, has its Riſe at the ſame *Apophyſis* of the *Os Sphænoides* as the next preceding Muſcle; and like it deſcends to the Length of the Interval made by the interior *Ala* of the *Os Sphænoides* and the *Muſculus Pterigoidæus internus* of the inferior *Maxilla*, and growing tendinous, runs over the *Proceſſus Pterigoides*, and has its Inſertion into the anterior Part of the *Gargareon*.

The Tendon of this Muſcle extending over the *Apophyſis Pterigoides*, gives it a different Power from that of the next preceding Muſcle, tho' they have both their Riſe at the ſame Place; for this draws the *Gargareon* forwards and downwards by a peculiar Piece of Mechaniſm in Nature, which is no leſs remarkable here, than in any others of thoſe where the like Contrivance of a Pulley is made uſe of.

'Tis now Time to come to the Diſſection of the Muſcles of the inferior *Maxilla*, its Depreſſors being left (as mentioned in Chap. X.) at their reſpective Originations and Inſertions.

CHAP. XVIII.

Of the Muſcles of the lower Jaw.

THE Anatomiſts count Four Pair of Muſcles belonging to the lower Jaw, *viz.* the *Temporales*, *Maſſeteres*, *Digaſtrici* and *Pterigoidæi*, unto which *Fallopius* has added a Fifth, called by the more modern Authors *Petrigoidæi externi*, and *Riolan* a Sixth, *viz.* the *Quadratus Genæ*, called by him *Musculus latus*, which has been treated of before Chap. X.

The *Temporalis* or *Crotaphites* has a large ſemicircular fleſhy Origine, from Part of the *Os Frontis*, *Sincipitis*, *Sphænoides*, and *Temporalis*. From theſe ſeveral Places, its Fibres ſtretch (like Lines drawn from a Circumference to a Center) under the *Zygoma*, from whence alſo take their Riſe ſome fleſhy Fibres, joining with the aforeſaid at their inſerted, partly tendinous and partly fleſhy, Implantation, into the ſuperior Part of the *Proceſſus Coronæ* of the inferior *Maxilla*.

The Uſe of this Muſcle is, in Conjunction with its Fellow, to draw the lower Jaw upwards. And here I can't but obſerve by the by, that I could never obſerve thoſe terrible Symptoms moſt Authors ſpeak of in Wounds of this Muſcle; tho' I have ſeen Part of it divided to apply the *Trepanum* in Fractures of the Skull.

The *Maſſeter* is a ſhort and thick Muſcle, partly carneous, partly tendinous, having its Origination forwards at the firſt Bone of the *ſuperior Maxilla*, and backwards at the *Zygoma*; from thence deſcending with Fibres decuſſating each other in acute Angles, has its Inſertion in the lower and exterior Part of the lower Jaw-Bone.

This Muſcle is Aſſiſtant to the next preceding in its Function. The *Ductus ſalivalis ſuperior* taking its Paſſage over this Muſcle, by a peculiar Providence of Nature, does accelerate the Motion of the *Saliva* in Maſtication.

The *Digaſtricus ſive Biventer*, is ſo called from its double Belly, and by ſome the

hoidæus, becauſe they imagine its Origi-
on to be at the *Proceſſus Styliformis*. Its
is fleſhy at the anterior Part of the *Apo-*
Maſtoides, whence deſcending, it grows
inous, paſſing through the *Stylohyoidæus*,
an annular Ligament laterally faſtened
he *Os Hyoides*. From this Bone ſome
inous Fibres ariſe, and unite with its
y Belly, aſcending from thence to its
antation, which is at the middle of the
ior Part of the lower Jaw.
he middle Tendon of this Muſcle, and
ellow, taking their Paſſage thro' two
lar Ligaments fix'd to the *Os Hyoides*
Ropes through a Pulley, is a moſt ad-
ble Contrivance of the Author of Na-
to render them capable of pulling the
r Jaw down; which they could never
accompliſhed, had their Progreſs been
t from their Originations. Nor is
any Proceſſes, whether of the *Verte-*
of the Neck or of the adjacent Parts,
h could give an Origination to theſe
les below their Inſertions, as in ſome
*ruped*s; for which Reaſon it is, that
reat Architect of our Body has thought
fix this double Pulley below their Im-
ations, whereby they are enabled to
rm the Office for which they were de-
d.

that when theſe Muſcles act, Deglu-
is hindered by their preventing the
t of the Tongue and *Larynx*. Neither
he lower Jaw be moved downwards at
Time, becauſe the Center of Direction
ved upwards. But in Dogs and other
ious Animals, who have the Origina-
of theſe Muſcles at the tranſverſe Pro-
of the firſt *Vertebra* of the Neck, theſe
ns are not dependent, and therefore
devour their Food ſo quick.
e *Pterigoidæus internus*, having received
me from its Origine and Situation, has
ſe, partly fleſhy, partly tendinous, from
pophyſis Pterigoides of the *Os Sphænoides*,
e it deſcends to its Inſertion at the in-
and inferior Part of the lower Jaw,
te to the Implantation of the *Maſſe-*

hen either of theſe Muſcles are in
n, the Jaw is drawn to the oppoſite
but if both act jointly, they are aſ-
to the *Temporales* and *Maſſeteres*.

N. B. When you intend to diſcover the next following Muſcle, you muſt remove the two next preceding on either Side: But if you are deſirous to have a full View of them, cut off with a Chiſſel Part of the *Proceſſus Corone*, together with the *Zygoma*.

The *Pterigoidæus externus* has likewiſe obtained its Denomination from its Origin and Situation, having its Riſe from the exterior Part of the *Apophyſis Pterigoides*, and ſuperior Part of the *Os Sphænoides*, is ſeated in the Cavity of the Temples, oppoſite to the *Os Jugale* or *Zygoma*, and turns backwards to its Implantation at the Neck of the *Proceſſus Condyloides* of the inferior *Maxilla*. When this and its Fellow are in Action, they draw the lower Jaw forwards, and force the Teeth of the inferior Jaw before thoſe of the ſuperior.

CHAP. XIX.

Of the Muſcles of the Thorax.

THis Part of our Body has two different Motions; the firſt being the Movement of the whole Cheſt, with its Contents, on the *Vertebræ* of the Back; and the Second, of the Parts which encloſe its Concavity, to wit, the Ribs, by the ſucceſſive Elevation and Depreſſion of which the Space encloſed within them is either enlarged or diminiſh'd, which was neceſſary for Reſpiration.

The Muſcles which are the Inſtruments of its Motion are divided into *Proper*, and *Common*.

The *Proper* are ſuch as are peculiar to it, and have both their Originations and Inſertions limited within the Compaſs of the *Thorax*.

The *Common* are thoſe which, tho' they have ſome Reference to the adjacent Parts, yet chiefly exert their Functions in this.

Theſe again are ſubdivided into *Principal*, ſuch as are implanted here, and immediately moving this, together with thoſe Parts from which they ariſe; others are *Aſſiſtant*, moving thoſe contiguous Bodies only whoſe ſubordinate Actions contribute to the better performing the grand Movement.

Thus, in ordinary Reſpiration, the Elevation of the *Scapula* is neceſſary, becauſe the

Ser-

Serrati would not be able to act without it. Thus in the *Asthma*, *Peripneumonia*, Pleurisy, and some other Cases, where these Parts are affected with an Inflammation or Obstruction in the due Performance of their Functions, the Extension of the *Vertebræ* of the Neck becomes necessary for the Introsusception of Air, thro' the *Aspera Arteria* and Repletion of the *Vesiculæ* of the Lungs.

Riolan, *Caspar Bauhin*, and their Followers, account three Pair of *proper* Muscles to the *Thorax*, which have their Situation on the anterior Part, *viz.* the *Subclavius*, *Serratus Major Anticus*, and *Triangularis*, which *Fallopius* has augmented with Six more, *viz.* Three on each Side, by us called the *Scalenus primus*, *secundus*, and *tertius*. But in our Demonstration, I have rather chosen to place the Two first together with the Three last among the Muscles *common* to the *Thorax* and the adjacent Parts, and join the *Intercostales* with the *Triangularis*, which are all the proper Muscles placed before.

The *Intercostales externi & interni*; their Names declare their Situation, *viz.* in the Interstices of the Ribs; so that their Number on both Sides is twice Eleven, equal to the Number of the Intervals, where they have their Positions.

There is no small Difference among the Anatomists concerning their Originations; but we shall follow the Footsteps of Dr. *Mayow*, who fixes the Rise both of the *Intercostales externi* and *interni* to the lower Edge of each superior Rib, and their Insertion to the superior Edge of each inferior Rib. These are thin and fleshy, and the Fibres of the *Externi* run from above downwards to the anterior Part of the *Ossa Pubis*. Those of the *Interni* descend also obliquely towards the posterior Part of the *Os Sacrum*, their Fibres decussating one another like the Letter X.

To discover the next following Muscle, the *Sternum* must be raised by separating its Cartilages on each Side from the osseous Extremities of the Ribs, and it will appear underneath.

The *Triangularis*, with its Fellow, is placed on each Side of the *Cartilago Xiphoides*, under the *Sternum*, within the Concavity of the *Thorax*; sometimes it appears to be three, sometimes four on each Side. Its Origination is at the lower Part of the *Ster*... whence its superior Part ascends, and its ... ferior Part descends, to its Insertions at ... osseous Extremities of the Fourth, ... Sixth, and sometimes Seventh and Eighth Ribs, near their Connexions with their Cartilages.

Its Use is said to be to contract the Breast.

The *Common* Muscles, or such as move the *Thorax* in common with the contiguous Parts to which they are fastened, are Three *Scaleni*, two *Serrati antici*, *Subcla...* and the *Diaphragma*.

The *Scalenus primus* has its Rise fleshy from the anterior Part of the Second, Third, and Fourth transverse Processes of the *Vertebræ* of the Neck, and descending obliquely forwards, grows tendinous at its Implantation to the first Rib. The axillary Nerves take their Passage betwixt this and the next following Muscle.

Its Use is to draw the upper Rib, together with the rest, upwards in Inspiration.

The *Scalenus secundus* arises fleshy from the Second, Third, Fourth, and Fifth transverse Processes of the *Vertebræ* of the Neck laterally (like the former), as it descends becomes thin and tendinous, and passing over the first, is implanted into the Second and sometimes to the Third.

The *Scalenus tertius* has its Origination near the next preceding, *viz.* from the Second, Third, Fourth, and Fifth transverse Processes of the *Vertebræ* of the Neck, likewise from the Fifth, and Sixth of those Processes, and soon after has its Implantation to the first Rib.

These Three last mentioned Muscles have taken their Names of *Scaleni* from their Figure, having three unequal Sides, and are most commonly described among the Muscles of the Neck; but *Fallopius* duly considering the *Subclavius* and *Serratus superior posticus* to be insufficient for the Elevation of the *Thorax*, does assign to these some Share of that Function.

The *Subclavius* being the next that falls in View in Dissection, has its Rise fleshy from the inferior Part of half the *Clavicula*, near its Connexion with the Spine of the *Scapula*, from whence its Fibres descend obliq...

wards to the ſuperior Part of the firſt
b, near the *Sternum*, where it has its In-
tion.
Its Uſe is mentioned in the next preceding
uſcle, *viz.* the Elevation of the Muſcle.
t *Spigelius* on the other Hand aſſerts, that
depreſſes the *Clavicula*; and to back his
inion alledges an Obſervation from *Hip-*
rates, that when the *Clavicula* is fractur'd
r the *Sternum*, that next Part manifeſtly
ends, as that Part next the *Scapula*, toge-
r with the *Humerus*, falls down: But in
e it receive a Fracture near the *Scapula*,
n neither Part riſes, which, as the ſaid
thor not abſurdly conjectures, depends on
Termination of the Muſcle.
For in the firſt Caſe, it pulls the *Clavicula*
ether with the *Humerus* downwards, be-
uſe the Fracture is between its Implanta-
n and the contrary End of the Bone
ich is fix'd to the *Sternum*; but in the
er, the Fracture being on that Part where
as its Inſertion, it may draw the Ends of
Bone nearer each other.
The *Serratus minor Anticus* is by moſt Ana-
niſts number'd among the Muſcles of the
pula; but its Poſition ſhews that it may
e a Share alſo in the Elevation of thoſe
os where it has its Implantation, and there-
e offer it indifferently, whether belonging
the *Thorax* or to the *Scapula*; but thought
to inſert it here, becauſe in Diſſections it
w appears *inſitu*, and if due Care be not
en in raiſing the *Pectoralis*, you will be in
nger of wounding this.
ts Riſe is fleſhy, from the *Proceſſus Cora-*
es Scapula, and it deſcends obliquely
wards, growing broader and thinner, and
mplanted fleſhy to the oſſeous Part of the
ond, Third, Fourth, and Fifth Ribs.
When the *Scapulæ* are elevated by their
per Muſcles, this with its Fellow are
n capable of dilating the Breaſt in large
pirations; but when they are depreſſed,
ay be eaſily conceived with what Diffi-
ty that Action muſt then be performed.
he *Serratus major Anticus* has its Origi-
ion fleſhy, from the whole Baſis of the
pula, and taking its Paſſage under the
ſcapularis, it grows broader and thicker,
ſtretching ſomewhat forwards, till it
nſerted into the eight ſuperior Ribs late-
rally by ſo many different and diſtinct fleſhy Portions, or *Digitali*, repreſenting the Teeth of a Saw, the Two, and ſometimes Three inferior, of which have their Indentations with the *Obliquus aſcendens Abdominis*, as has been mentioned before.

The Uſe of this is, like the former, to dilate the *Thorax*, and move the *Scapula* forwards and downwards when its Muſcles are relaxed.

The next Muſcle belonging to the *Thorax*, which falls in our View as the Body lies ſupine, is the *Diaphragma*, which, without inſiſting on the many Names beſtowed on this Part, we will conſider it here only as a ſingular Muſcle framed for ſome peculiar Uſes.

The *Diaphragma* is by ſome made a *Digaſtric*, and by *Gaſpar Bartholin* a *Trigaſtric* Muſcle, which may ſeem to quadrate to this Part in Birds. But whether in Man it be a ſingle or double Muſcle, is of no great Uſe, it being ſufficient to know, that its inferior Part has its Riſe, partly tendinous and partly fleſhy, on the Right, from the Firſt, Second, and Third *Vertebra* of the Loins; on the Left from the laſt and laſt but one of the Back; hence aſcending, with fleſhy Fibres on each Side running ſtrait, but in the Middle run ſomewhat curvedly interſecting each other, do as it were embrace the *Oeſophagus*; after which growing tendinous, join with its ſuperior Part, which ariſes thin and membranous, but ſoon grows fleſhy, at the whole inferior Edge of the Cartilaginous Extremities of the Ribs, and the inferior Part of the *Sternum*; whence its carneous Fibres, like Lines drawn from a Circumference towards a Center, run on to its middle Part, where its tendinous Fibres are intercaſſated with each other, and exhibit a *Rete*.

It has Two remarkable Perforations, *viz.* One in its tendinous Part, which gives Paſſage to the *Vena Cava*, toward the Right *Auricula* of the Heart; and the other in its carneous Part, which incloſes the *Oeſophagus* like a Ring. Its double Origine at the *Vertebræ* gives Paſſage to the deſcending Trunk of the *Arteria magna*, and to two aſcending, *viz.* the Chyliferous Duct and the *Vena Azygos*.

The Uſe or Office of the *Diaphragma* is ſo ample and comprehenſive, as not to be related in this Place. However, *Pecquet* has made this remarkable Obſervation, That when all the Muſcles ſubſervient to Reſpiration are ſeparated and removed, the *Diaphragma* and *Intercoſtales* excepted, the Animal ſtill perſiſts to breathe. In Inſpiration its ſuperior Surface approaches towards a Plain; but in Expiration, it becomes Convex towards the *Thorax*, and Concave towards the lower Belly. In the former the *Viſcera* of the *Abdomen* are compreſs'd, and the Cavity of the *Thorax* enlarged; in the latter the Air is expreſſed out of the Veſicles of the Lungs.

Here we might give you an Account of another ſingular Muſcle, *viz.* the Heart; but this being no Inſtrument of voluntary Motion, and ſufficiently deſcribed by *Lower*, *Vieuſſens*, amd others, we will ſuperſede the Treating of it here.

N. B. The better to proſecute the Diſſection, the Body muſt now be laid with the Back uppermoſt; then continuing your Diſſection from the *Os Occipitis* down to the *Os Sacrum*, you muſt interſect it with a tranſverſe Line over the Region of the Loins, when the common Teguments being removed, the ſubjacent Muſcles may be diſſected in the following Order.

CHAP. XX.

Of the Muſcles of the Scapula *or Shoulder-Blade.*

THeſe Muſcles make a Third Sort of thoſe belonging to the *Thorax*, the Reaſon whereof has been alledged at the Beginning of the next preceding Chapter.

The *Cucullaris & Trapezius* has received its Name, becauſe it, in Conjunction with its Partner, is not unlike a Cowl. Its Riſe is fleſhy at the *Occiput*, and tendinous from the Ligament of the Neck, and the Point of the Spine of the laſt *Vertebra* of the Neck, and Eight ſuperior of the *Thorax*; from which broad Origination becoming fleſhy and thick, is ſo implanted into the Clavicle, and tendinous into the Spine of the *Scapula*.

Each of theſe Two Muſcles is triangular, ſo that both conjoined together make a Lozenge, or a *Trapezium*, the larger Diameter of which ſtretches from the *Os Occipitis* to the Fifteenth *Vertebra*, and the ſhorter extends from near the Extremity of the *Spine* of the *Scapula* on one Side to that of the other. They conſiſt of a threefold Order of Fibres, the middle running directly tranſverſe from the firſt *Vertebra* of the *Thorax*, the ſuperior deſcend, and the inferior aſcend to their Inſertion, by which Means the *Scapula* is moved according to their Directions either obliquely upwards, directly back, or obliquely downwards.

N. B. In the Separation of this Muſcle you muſt act with Caution, for fear of raiſing the next following with it, becauſe it ſticks very cloſe to its tendinous Part, where it ariſes from the ſuperior Spines of the *Vertebræ* of the *Thorax*.

The *Rhomboides* is ſo called from its Figure, and has its Situation under the next preceding. I have in ſome Subjects obſerved it divided into two diſtinct Muſcles on each Side, which has been obſerved by *Bidloo* alſo. Its Riſe is tendinous, from the two inferior Spines of the *Vertebræ* of the Neck and the four ſuperior of the *Thorax*, whence deſcending obliquely, it grows thick and fleſhy, and ſo is implanted into the whole *Baſis* of the *Scapula*.

Its Uſe is to draw the *Scapula* upwards and backwards.

You muſt proceed with a great deal of Caution in the Separation of this Muſcle, becauſe it ſticks very cloſe to its ſubjacent the *Serratus ſuperior Poſticus*.

The *Levator Scapulæ* is called by ſome the *Levator Patientiæ*, becauſe it is made uſe of in large Inſpirations, in order to expire, and in Sighing. It has its Situation immediately under the *Cucullaris*, and its Riſe at the Second, Third, Fourth, and Fifth tranſverſe Proceſſes of the Neck, by ſo many diſtinct Originations, which being conjoined in one large fleſhy Body, deſcends obliquely to the Superior Angle of the *Scapula*, where it has its Inſertion.

Its Name ſhews its Uſe.

N. B. The next that ſucceed in due Order of Diſſection are the Muſcles of the *Thorax*, which appear on the back Side when

e Body lies prone. To diſcover theſe, u muſt remove the *Latiſſimus Dorſi*, part which has been raiſed in the *Ilia* in the ſſection of the Muſcles of the lower Belly, here now you muſt continue its Separa- n by cutting it from the back Part of the ine of the *Ilium*, and ſeparating it (if ſſible) from the *Serratus major Poſticus*, as to clear it from the Spines of the Loins d of the inferior of the *Thorax*, and then ve it to the *Os Humeri*, the Place of its nplantation. This being done on each de, the remaining Muſcles of Reſpiration fer themſelves to your View.

CHAP. XXI.

f the Muſcles of the Thorax *which appear, the Body lying prone.*

N the Deſcription of theſe Muſcles, we ſhall obſerve the ſame Order as in thoſe the fore Part in *Chap.* XVIII. according which, we begin with the *Proper* Muſ- es belonging to the *Thorax*.

The *Serratus Superior Poſticus* has its Poſi- on immediately under the *Rhomboides*, and s Riſe with a thin Tendon at the two in- ior Spines of the *Vertebræ* of the Neck, and e three Superior of the Back; from thence ſcending obliquely over the *Splenius Capitis*, d the *Sacro Lumbaris* and *Dorſi Longiſſimus*, grows fleſhy, extending under the *Scapu-* to its Implantation at the Curvature of e ſecond, third and fourth Ribs, by ſo any ſeparate fleſhy Terminations repre- nting the Teeth of a Saw.

This Muſcle is Aſſiſtant in the Elevation the Ribs or *Thorax*.

The *Serratus Inferior Poſticus* has a much rger Origination than is generally obſer- d by the Anatomiſts: For in a robuſt Body obſerved its Continuation, not only from e Spines of the *Vertebræ Lumbares*, but al- from all thoſe of the *Thorax*, as well un- rneath as below the next preceding Muſ- e; its upper and lower Parts being altoge- ndinous, but its Middle becoming fleſhy ear its indentated Implantation at the Cur- ture of the ninth, tenth, eleventh, and the xtremity of the twelfth Ribs. The *Series* Fibres of this Muſcle running tranſverſe, and thoſe of the next preceding oblique, do decuſſate one another in acute Angles; as *Riolan* has very well obſerved, and contrary to the common received Opinion, has aſſign'd it with its Fellow a different Office in depreſſing the *Thorax*; both of them ſerving inſtead of a Bandage, in binding together by Conſtriction the poſterior Muſcles of the Spine, not unlike thoſe conſtrictive Incloſures of the Cubit and Thigh, of which hereafter.

The *Common* Muſcles aſcribed to the *Thorax*, which appear on the Back, are the *Sacro Lumbi*; which tho' they may be numbred alſo among thoſe of the Back, yet we will follow the Footſteps of moſt Anatomiſts, and give an Account of them here.

The *Sacro Lumbaris* has its Origination in Common with the *Dorſi Longiſſimus*; externally they are tendinous, as they ariſe from the poſterior Part of the Spine of the *Os Ilium* and ſuperior Spine of the *Os Sacrum*, and all the Spines of the *Vertebræ Lumbares*. Internally it has its Riſe fleſhy, not only at theſe Parts, but at the tranſverſe Proceſſes of the laſt mentioned *Vertebræ*, whence aſcending with direct Fibres, before it paſſes over the laſt Rib, it is divided into two fleſhy Bodies, the exterior of which is called the *Sacro Lumbus*, whoſe Fibres aſcending directly from ſo many thin Tendons as there are Ribs, into which they have their Inſertions; which are joined with ſome acceſſory Muſcles ariſing from each Rib, and united with them before their Inſertion in their Paſſage over the Superior. This various Order or Diſpoſition of it, is continued the whole Length of the *Thorax*, to the third, fourth, fifth and ſixth *Vertebræ* of the Neck; and this ſuperior Part is by *Diemerbroeck* made a peculiar Muſcle, and called the *Cervicalis deſcendens*.

CHAP. XXII.

Of the Muſcles of the Head.

WE now proceed to the Examination of the Muſcles of the Head, which are diſtinguiſhed into *Proper* and *Common*.

The laſt of theſe Two are ſuch as move the Head, together with the *Vertebræ* of the

Neck; of which in the next following Chapter, under the Title of *The Muſcles of the Neck.*

But the Firſt, or the *Proper*, are thoſe Muſcles which move the Head together with the firſt *Vertebræ* only; of theſe, *Spigelius*, *Veſlingius* and ſome other later Authors, reckon ſeven Pair, *viz.* the *Maſtoidæi*, *Splenii*, *Complexi*, *Recti Majores*, *Recti Minores*, *Obliqui Superiores*, and *Obliqui Inferiores*. Unto theſe, *Oribaſius* and *Fallopius* add two Pair more, which ſhall be deſcribed here as they offer themſelves in Diſſection, as alſo another Pair of Muſcles of my own Obſerſervation ſome time ſince.

The *Splenius* has received its Name from its Figure, which is not very unlike an Oxe's Spleen, having its Riſe partly tendinous and partly fleſhy from the Four ſuperior *Vertebræ* of the *Thorax*; the inferior Part ſeems to be diſtinct from its ſuperior, which ſprings from the Spines of the two inferior *Vertebræ* of the Neck. The former aſcending obliquely becomes fleſhy, and grows tendinous again at its Implantation into the ſecond, third, and fourth tranſverſe Proceſſes of the Neck; the latter aſcending in the ſame Manner obliquely outward becomes fleſhy, and is ſo implanted to the *Occiput*, part of it lying under the Inſertion of the *Maſtoidæus*.

Tho' this Muſcle has a Place allotted him amongſt the *Proper* Muſcles of the Head, yet in its Action it muſt of neceſſity move the ſecond and third *Vertebræ* of the Neck (where it has its Inſertion) obliquely backwards; but when it acts in concert with its Fellow, it draws them directly backwards.

The *Complexus*, is call'd alſo the *Implicatus* and the *Trigeminum*, from its being ſaid to have three Originations, tho' I could never as yet obſerve any ſuch thing. It has its Riſe with ſix thin ſmall Tendons, from the tranſverſe Proceſſes of the *Vertebræ* of the Neck, and thence becoming thicker in its Deſcent, and more fleſhy, becomes partly tendinous about its Middle, where it is intertexed with divers *Series* of Fibres, and becoming ſtill more fleſhy again, is ſo implanted into the ſuperior Part of the *Occiput* laterally, and the poſterior Part of the *Apophyſis Mammillaris*, the Fibres of this Muſcle do decuſſate thoſe of the next preced[ing]. *Fallopius* ſays, that part of it, which has Inſertion into the *Apophyſis Mammillaris*, a diſtinct Muſcle; it having its Riſe fr[om] the tranſverſe Proceſſes of the firſt, ſecond, third, fourth and fifth *Vertebræ* of the *Thorax*, and from the ſame Number of thoſe of the Neck. I have ſometimes made the ſame Obſervation, but its not appearing ſo commonly, makes me believe it rather to be *Luſus Naturæ*, than a diſtinct Muſcle.

When either of theſe *Complexi* are in Action, the Head is moved backwards [to] one Side; but if both act together, they are ſubſervient to the former.

This Muſcle with its Fellow being ſeparated, the four following Muſcles offer themſelves underneath on each Side.

The *Rectus Major* has its Riſe partly tendinous, but for the greateſt Part fleſhy from the ſuperior Part of the double Spine of the ſecond *Vertebræ* of the Neck; in its Aſcent it grows broader and fleſhy, and is ſo implanted into the back Part of the *Occiput*.

When this Muſcle with its Fellow is in Action, the Head is pull'd directly back on the firſt *Vertebræ*.

N. B. After theſe both are raiſed, the following will make their Appearance, the four ſubſequent as well as this having received their Denominations from their Progreſs, Situation or Magnitude.

The *Recti Minores* are two ſmall Muſcles offering themſelves to your View both at once. Their Riſe is fleſhy from the back Part of the firſt *Vertebræ* of the Neck, and are ſo implanted into the middle Part of the *Occiput*, in two ſuperficial Depreſſions of the ſaid Bone. Theſe may alſo be call'd *Renuentes* or Nodders backwards from their Uſe, being Antagoniſts to thoſe we ſhall give you an Account of hereafter, and of *Annuentes*.

The *Obliquus ſuperior* has its Origination fleſhy at the poſterior Part of the tranſverſe Proceſs of the firſt *Vertebræ* of the Neck and aſcending ſomewhat obliquely, becometh a fleſhy Belly, but leſſening it ſelf again, has its Inſertion into the *Occiput* laterally.

This Muſcle never acts without its Fellow, and in their Action the Head is

backwards on the first *Vertebræ*. Tho' two next preceding Muscles seem to be ted for all necessary Motions of the d backwards, yet provident Nature has ught fit to add these; since the *Recti ores* are extended by Accident when r of the following Muscles are put in ion, and turn the Head to one Side, reby they are deprived of performing r Use at that time: But the first *Verte-* of the Neck moving with the Head, e Muscles then are put in Action in ling the Head backwards, as in looking wards to one Side.

The *Obliquus inferior* has its Rise fleshy, n the exterior Part of the spinal Process he second *Vertebræ* of the Neck, just by Origine of the *Rectus Major*, and then anding it self into a fleshy Belly, goes obliquely to its Implantation at the nsverse Process of the First, where the t preceding Muscle has its Beginning.

When this acts on either Side, the transe Process of the first *Vertebræ* of the Neck noved towards the Spine of the Second, ence it is, that it has by some been numd among the Muscles of the Neck; but e it also contributes to the Motion of the d, and the Face turned on that Side on ich it acteth, it may not improperly be ced amongst the Muscles that move the ad.

Now it is that the Body must be turned the Back again, in order to enter upon Examination of the remaining Muscles he Head, which appear on the fore Part, ether with those of the Neck; amongst se, the *Mastoidæus* challenges the first ce, which is best raised, by clearing it its Origination on one Side, and its In-t:on on the other.

The *Mastoidæus* has obtained its Denomition from its being implanted into the *physis Mammillaris* of the *Os Temporum*. Rise is partly tendinous and partly shy, from the superior Part of the *Ster-m*, and near half the *Clavicula*, with two it were) distinct Originations; the first ending somewhat obliquely outwards ites with the second, and passing up ore directly, forms a round, thick, fleshy dy, and as it extends it self over the *Mus-lus Levator Scapulæ*, grows broader again at its Insertion to the posterior Part of the Mammillary Process, and the adjoining Part of the *Occiput*, where the *Splenius* has its Implantation.

The Authors not having made exact Observations concerning the true Insertion of this Muscle, have been generally mistaken in their Conjectures concerning the true Use of it; for they suppose, that when both of them are in Action, the Head is bended forwards, which Function, if well considered, can't be performed by these Muscles, unless the *Vertebræ* of the Neck are at the same Time inclined forward with the Head; since their Implantations are right *E Diametro* opposite, if not behind the Articulation of the Head, with the first *Vertebræ*; which part of the Skull (to wit, the *Apophysis Mammillaris*) does neither ascend nor descend in that Action. Whence it is evident, that when the Head is moved either directly forwards or backwards on the first *Vertebræ*, these Muscles cannot act; but if either of them be in Action, the Face is then turned to the contrary Side: Thus when we look over the left Shoulder, the right Muscle is in Action, *& vice versa*. But if either of these Muscles should be more contracted, the Head is pulled down to one Side forwards, as it is to be observed in long Necks, where one of the Muscles is always contracted.

The next Muscle that offers it self in Dissection, is described by *Galen*, and mentioned by *Vesalius*, *Riolan*, *Casp. Bartholin*, *Eustachius*, and others. *Fallopius* makes it the ninth Pair; but *Spigelius* and some others don't take the least Notice of them, notwithstanding they are large and fleshy Muscles, and have their Position immediately under the *Gulæ* or *Pharynx*; they are called the *Recti externi* by *Bidloe*: But because I have discovered another small Pair of Muscles placed underneath them of a right Position likewise, and therefore likewise deserving the Name of *Recti*, to distinguish which from those of the back Part and these following Muscles, we shall call them *Recti interni minores*, and these *Recti interni majores*.

The *Rectus internus minor* has its Rise tendinous, but for the most Part fleshy, from the anterior Part of all the transverse Processes

ceſſes of the *Vertebræ* of the Neck, except the Firſt and Second, and growing fleſhy in its Aſcent, ſtretches over theſe two ſuperior *Vertebræ*, and has its Inſertion into the anterior *Appendix* of the *Occiput*, near the great *Foramen* that gives Paſſage to the *Medulla Oblongata*. It manifeſtly bends the Head forwards.

This with its Fellow being removed, the following Muſcles diſcover themſelves underneath them.

The *Rectus internus minor*, and its Fellow, make their Appearance on the anterior Part of the firſt *Vertebræ*, like the *Recti minores* on the poſterior Part; having their Riſe near its tranſverſe Proceſſes, and aſcending directly, are implanted to the *anterior Appendix* of the *Occiput* immediately under the next preceding. Theſe nod the Head forwards, being Antagoniſts to the *Recti minores* or the back Part, and therefore may be called alſo *Annuentes*.

The laſt Pair of Muſcles belonging to the Head, are exactly deſcribed by *Fallopius*, which we will call *Recti Lateralis* from their Poſition and Progreſs; they may alſo be called *Renuentes Lateralis* from their Uſe.

The *Rectus Lateralis* is a ſhort, thick and fleſhy Muſcle, having its Riſe from the ſuperior Part of the Extremity of the tranſverſe Proceſs of the firſt *Vertebræ* of the Neck, betwixt the next preceding and the *Obliquus ſuperior*, from whence it deſcends directly to the Interſtice made by the two *Apophyſes*, *Mammillaris* and *Styloides* on the *Occiput*. It nods the Head to one Side.

CHAP. XXIII.

Of the Muſcles of the Neck.

BEcauſe the Muſcles of the Neck contribute ſome Share towards the Motion of the Head by moving it ſecondarily, they are reckoned as *Common* to both: Of theſe there are four Pair, *viz.* the *Longi Colli*, the *Scaleni*, (deſcribed before among the Muſcles of the *Thorax*) the *Tranſverſales*, and *Spinati Colli*.

The *Longus Colli* has its Origination partly tendinous, but for the greateſt Part fleſhy from the anterior Part of the five *ſuperior Vertebræ* of the *Thorax*, and being ex-
panded in its Middle into a fleſhy Be
has its Implantation into the anterior P
of all the *Vertebræ* of the Neck.

When this and its Fellow are in Actio
the Neck is bent right forwards. Betw
this and the *Scalenus*, (deſcribed *Chap.* XI
the *Rectus internus major* treated of in t
next preceding Chapter has its Situatio
which *Veſlingius* calls *Muſculus Brevis*.

Now you muſt turn the Body on its Fa
again, for the Examination of the reſt
the Muſcles that appear on the back Part
the Trunk.

The *Spinalis Colli* has obtained its Den
mination, becauſe it accompanies the Spi
of the Neck: Its Riſe is from the five
rior tranſverſe Proceſſes of the *Vertebræ*
the *Thorax*, and inferior of the Neck; as
aſcends it grows more fleſhy, and is ſo
planted largely to the inferior Part of t
ſecond *Vertebræ* of the Neck laterally.

Theſe pull the *Vertebræ* of the Neck
rectly backwards; and when either of th
is raiſed, the following will make their A
pearance underneath.

The *tranſverſalis Colli*, has a fleſhy Or
nation from all the tranſverſe Proceſſ
the *Vertebræ* of the Neck, except the F
and Second, and has its Inſertion after
oblique aſcending Progreſs into their ſu
rior Spines; it being a Continuation
the ſame Order of muſcular *Fibres* th
compoſe *Sacer* and *Semiſpinatus*, of wh
anon.

In the Action of either of theſe Muſc
the *Vertebræ* of the Neck are moved o
liquely backwards, as when we look o
the Shoulder.

Beſides theſe, I have in Diſſection diſc
vered certain carneous Bodies ſituated
twixt the bifid Spines of each *Verte*
which upon a narrow View proved to
ſo many Pair of Muſcles as there was In
ſtices between the ſaid Spines. And in th
Bodies that have the ſpinal Proceſs of
laſt *Vertebræ* ſomewhat broader than ord
ry, I have obſerved five pair of theſe M
cles, which from their Situation we w
call the *Interſpinales Colli*, being ſmall fle
Muſcles, that have their Riſe from the
perior Parts of each double ſpinal Proce
the Neck, except that of the ſecond *V*

and have their Inſertion into the inſe-
Parts of all the ſaid double Spines.
the Action of theſe Muſcles, the Spines
e *Vertebræ* of the Neck are drawn near-
ch other. Theſe I firſt diſcovered in
Year 1690.

CHAP. XXIV.

the Muſcles of the Back and Loins.

would be in vain to enter here upon a
ecital of the different Opinions of the
tomiſts concerning theſe Muſcles, there
ſo great a Variety of them in divers
ects, that I am really apt to believe,
among ten of them, *Three* will ſcarce
und exactly alike in this reſpect; which
Fallopius ſay, that they ſeemed to be
digeſted and confuſed *Chaos*. To give
the beſt Account we are able, we will
der them as *Common* to the Back and
, or as *Proper* to either.
e *Common* are thoſe, that have their
from the one, and their Implantation
the other, as the *Dorſi Longiſſimus*.
e *Proper* are ſuch as have their Origi-
n from the *Os Sacrum* or *Ilium*, and
Inſertion into the *Vertebræ Lumbares*
as the *Quadrati Lumborum*, or have
Riſe from the tranſverſe Proceſſes, ei-
of the *Vertebræ Lumborum*, or thoſe of
horax, and their Implantation to their
ior Spines; as the *Tranſverſales Verte-*
m, Dorſi & Lumbarum, which by the
omiſts are called the *Sacer* and *Semi-*
s. We begin with the *Common* Muſcles.
Dorſi Longiſſimus has its Riſe in *Common*
the *Sacro Lumbaris* from the Spine of the
um, and the ſuperior Part of the *Sa-*
and all the Spines of the *Vertebræ*
ares externally tendinous, internally
in its Aſcent, it has its Implantation
he tranſverſe Proceſſes of the *Vertebræ*
ares; and in its Paſſage over the laſt
his great Muſcle it divaricates or di-
t into two, the Exterior of which is the
Lumbaris deſcribed *Chap.* XXI. but the
r next to the Spine, is the *Longiſſimus*
which aſcending with a partly Ten-
partly carneous Outſide, its Fibres
run ſomewhat obliquely outward. Part of theſe tendinous Fibres ſpring diſtinct from the inferior Spines of the *Vertebræ* of the *Thorax*, and from the ſuperior of the Loins, from which alſo ariſe ſome fleſhy Fibres aſcending obliquely inwards, and are inſerted into the fifth, ſixth and ſeventh Spine of the *Thorax*, as expreſs'd by *Bidloe*, and called *Semiſpinalis*. The other larger Part of this Muſcle on the *Thorax* branches out into many diſtinct carneous Portions, not unlike a Palm Twig, which are implanted in a twofold Manner to the tranſverſe Proceſs of each *Vertebræ* of the *Thorax*, and Protuberancy of each Rib, as likewiſe to the tranſverſe Proceſſes of the *Vertebræ* of the Neck.

When this Muſcle, together with its Fellow, are in Action, they are not only inſtrumental in keeping the Trunk of the Body upright, and bending it backwards, but they are alſo ſerviceable in walking; as may be ſeen when either Leg is moved forwards, this Muſcle acts on the ſame Side, which to us ſeemeth to be advantageous in rendring the *Os Ilium* ſtable at that time, by which means the Thigh may be elevated with more Conveniency, in regard it is ſo moved by a Muſcle that has its Riſe from the *Vertebræ* above the *Os Ilium*, to wit, the *Pſoas*.

When you intend to enter upon an Examination of this Muſcle, your beſt way is to make uſe of your Fingers or the pointed Haft of a Diſſecting-Kniſe, in order to ſeparate it from its Companion, *viz.* the *Sacro Lumbaris*, and diſcover its *Anſulæ*, as *Spigelius* calls them, being thoſe Parts of it which have their Inſertions into the tranſverſe Proceſſes of the *Vertebræ* of the Back and Loins. And this Muſcle being removed, the *Proper* Muſcles appear: We will begin with thoſe of the Loins.

The *Quadratus Lumborum* is a ſhort, thick, fleſhy Muſcle, ſeated in the Region of the Loins, or between the laſt Rib and Spine of the *Os Ilium*, having its Riſe fleſhy from the poſterior Part of the Spine of the *Os Ilium*, and its Inſertion into all the tranſverſe Proceſſes of the *Vertebræ Lumbares* internally under the Muſcle *Pſoas*.

The Uſe of this Muſcle is, like the *Rectus Abdominis*, either to move the *Vertebræ*

Lumbares nearer the *Os Ilium* laterally when we are ſtanding on both Legs firm, or elſe to move the *Os Ilium* nearer the *Vertebræ* of the Loins, or the contrary Side, when we ſtand upon one Leg.

The *Sacer* may be called alſo the *Tranſverſalis Lumborum*, is ſeated under the tendinous Part of the *Longiſſimus Dorſi*. Its Riſe is fleſhy, both from the *Os Sacrum*, and from the tranſverſe Proceſſes of all the *Vertebræ Lumbares*, and has its Inſertion into their ſuperior Spines. Sometimes there has been obſerved a *Spinalis Lumborum*, like the *Spinalis Colli* treated of before; which having its Origination from the ſuperior Spines of the *Os Sacrum*, and paſſing on with direct carneous Fibres, is ſo inſerted into the ſuperior Spines of the *Vertebræ Lumbares*, the juſt now deſcribed *Tranſverſalis Lumborum* being placed under it.

The *Semiſpinatus* being nothing elſe but a Continuation of the next preceding Muſcle, might upon that Score not improperly be called the *Tranſverſalis Dorſi*. Its Riſe is fleſhy, from all the tranſverſe Proceſſes of the *Vertebræ* of the *Thorax*, and paſſing directly upwards, has its Implantation in the ſuperior Spines of the ſaid *Vertebræ*.

When theſe with the former, and *Tranſverſales Colli*, are in Action, they move the whole Spine or *Vertebræ* of the Neck, Back and Loins, obliquely backwards, as it happens when we are endeavouring to look very much behind us; when they are all acting together on each Side, they are Aſſiſtant in erecting the Trunk of the Body.

There was a conſiderable Number of Multiform Muſcles required to be ſubſervient to the Extenſion or Erection of the Head, Neck, Back and Loins, becauſe it could not be accompliſhed without a great Force, in regard to the projecting forwards of the *Head* and *Thorax*; for were it not conſtantly ſupported by ſo many ſtrong Muſcles, it would always be liable to fall on its Face, inſtead of being moved forwards, backwards and ſideways, which Flexibility could not be ſupported upon all ſuch Occaſions by any other Means but by Muſcles, ſince it were they only that are capable of a greater Contraction and Relaxation than any other ſpringy Bo compoſed of Ligaments, *&c.*

After the Muſcles that appear, as ſa yet known in the Trunk of the Body, t of the Limbs or *Artus* come in of Co and thoſe of the Arm firſt, among w the *Pectoralis* and *Longiſſimus*, did before under the Diſſecting-Knife, in order to cover the ſubjacent Muſcles, but now give you a Deſcription of them among reſt, as the Order of Diſſection requ For the more eaſie Performance of this monſtration, we commonly take off whole Arm, together with the *Scapula* *Clavicula*, by ſeparating the *Clavicle* from *Sternum*, by which Means the Trouble Adminiſtring the following Muſcles much leſſened, thoſe moving the *Sc* being cut from it.

CHAP. XXV.

Of the Muſcles belonging to the Humeri, *or to the Arm.*

MOST commonly ſeven Muſcles appropriated by the Anatomiſts to Arm, *viz.* the *Pectoralis Deltoides*, *Major*, *Latiſſimus Dorſi*, *Supraſpinatus*, *Spinatus* and *Subſcapularis*. *Riolan* men another, called by him *Coracobrachiæus*; to which *Caſſerius Placentinus* has added ther, called the *Teres Minor*, and by reckoned to be the eighth Muſcle of Part, whence it has obtained its Name the *Octavus Humeri Placentini*.

The *Pectoralis* has received its Name its Poſition. Its Origination is h ſemicircular, and fleſhy above, from half the lower Part of the *Clavicle*; b from the *Sternum*, and all the cartila Extremities of the ſix upper Ribs; and the oſſeous Part of the Seventh, it ha diſtinct *Faſciculus* of fleſhy Fibres (w ſometimes are obſerved, confounded the *Obliquus Deſcendens Abdominis*); from large Beginning it paſſes on tranſverſ and becoming narrower but thicker, i ſened as it ſtretches over the ſuperior of the *Biceps Cubiti*, and has its Inſertion a ſhort but broad ſtrong Tendon, to upper Part of the *Os Humeri*, above the

antation of the next following Muſcle. he Fibres of this Muſcle decuſſate one ano- er near their Inſertion into the *Os Humeri*; oſe of the ſuperior Part ſtretching down- ards, and thoſe of the Interior extending wards, make an Interſection with the rmer in acute Angles.

The Uſe of this Muſcle is to move the rm either obliquely upwards, or directly twards, or obliquely downwards, accord- g to the various Directions of its different *ries* of Fibres.

The *Deltoides* having received its Name m its Figure, which is like the *Greek* Δ, ſes broad forward, from above one Third the lower and outer Part of the *Clavicle*, here it is altogether fleſhy; but backward ariſes partly fleſhy, but for the greateſt rt tendinous, from the whole lower ge of the Spine of the *Scapula*. As it de- nds from theſe Places, it ſoon grows ick and fleſhy, becoming narrower, till Inſertion by its fleſhy Part, and partly ndinous *Apex*, into the Middle of the *Os meri*.

The Uſe of this Muſcle, is to draw the rm either directly upwards, or ſomewhat wards or backwards, according to the ious Directions of its different *Series* of bres.

The *Supraſpinatus* has obtained its Deno- nation from its Situation, which is above Spine of the *Scapula*. Its Origination is ſhy, from the ſuperior Part of the *Baſis* the Shoulder-blade, *viz.* above its Spine, alſo from the ſaid Spine and *Coſta Superior* the *Scapula*. From thence taking its urſe betwixt the *Proceſſus Coracoides* and *choriformis*, it becomes leſs, and growing dinous, ſtretching over the Articulation the *Humerus*, and joining its Tendons th the next following, has its Inſertion o the Head of the *Os Humeri*.

The proper Uſe of this Muſcle, is to up the Arm towards the *Occiput*.

The *Infraſpinatus* has likewiſe received its me from its Poſition, which being below Spine, it has its Riſe fleſhy from the ver Part of the *Baſis* of the *Scapula*, as ewiſe from its Spine and inferior *Coſta* *Dorſum*: From thence it ſtretches in a angular Figure, according to the Figure the Part, and leſſening it ſelf as it runs over the Articulation, it grows tendinous, and has its Inſertion like the next preceding into the Head of the *Os Humeri*.

The Uſe of this Muſcle, is to move the Arm directly backwards.

The *Teres Minor* has its Name from its Figure and Magnitude, to diſtinguiſh it from the next following. In ſome Subjects it is confounded with the former, but in others it is found diſtinct.

Its Origination is fleſhy, from the inferior Part of the inferior *Coſta* of the *Scapula*, and deſcending obliquely over the ſuperior Head of the *Gemellus Major*, it there becomes tendinous, and has its Implantation into the *Head* of the *Os Humeri*.

The Uſe of this Muſcle, is to move the Arm ſomewhat backwards and downwards.

The *Teres Major* has its Riſe from the lower Angle of the *Scapula*, and growing a round fleſhy Body, aſcends obliquely with the next preceding, and then ſtretching under the ſuperior Head of the *Gemellus*, with a flat and ſhort Tendon, is implanted below the Neck of the *Os Humeri*, next adjoining to that of the next following.

The *Latiſſimus Dorſi ſive Aniſcaptor*, has its firſt Denomination from its large Dimenſions, for in Conjunction with its Fellow, it covers the whole Back; and the Second, from the Uſe that is ſometimes made of it. Its Origine is thin, broad and tendinous, and continued from the ſeven inferior Spines of the *Vertebræ* of the *Thorax*, and all thoſe of the Loins and ſuperior of the *Os Sacrum*, and the poſterior Part of the Spine of the *Os Ilium*. It begins to become fleſhy as it ſtretches over the *Longiſſimus Dorſi* and *Sacrolumbus*, and in its Progreſs over the curvated Part of the Ribs, it receives divers *Faſciculi* of carneous Fibres ariſing from thence, and theſe by their Conjunction compoſe a thick Body, ſtill becoming leſs in its Dimenſions as it paſſeth on towards the Armpit; and extending over the lower Angle of the *Scapula*, ſometimes there ariſes into a fleſhy Part, (which is more eſpecially obſervable in thoſe Subjects in whom the *Teres Major* is not extant) and at laſt has its Implantation by a ſhort and flat, but a ſtrong Tendon, into the *Os Humeri*, near the next preceding.

The *Coracobrachialis*, by ſome called the *Perforatus*, deſcribed by *Galen* and *Veſalius*, with the internal Head of the *Biceps Cubiti*, has obtained its Denomination from its Origine and Implantation: Its Riſe is partly carneous and partly tendinous, from the Extremity of the *Proceſſus Coracoides Scapulæ*; in its Deſcent it grows larger, cloſely adhering to the internal tendinous Origination of the *Biceps*, and Parts from it, near its tendinous Implantation, at the Middle of the interior Part of the *Os Humeri*. This Muſcle gives Paſſage to a large Nerve, whence by ſome it is called the *Perforatus*.

Its Uſe is to move the Arm upwards, and to turn it ſomewhat obliquely outward.

The *Subſcapularis* has received its Name from its Situation, being called by ſome the *Immerſus*. This Muſcle being large and carneous, fills the internal concave Part of the *Scapula*, having its Riſe fleſhy from its whole *Baſis* and *ſuperior* and *inferior Coſta* internally, and paſſing forwards leſſeneth it ſelf according to the Dimenſions of the Bone, and ſtretching over the Articulation, having its Implantation Semicircularly into the Neck of the *Os Humeri*.

In the Action of this Muſcle, the *Os Humeri* is drawn nearer to the Trunk of the Body. The Tendon of this Muſcle, together with the *Supra* and *Infraſpinatus* and *Teres Minor*, are conjoin'd near their Implantations, and embrace the Articulation of the *Os Humeri*, with the *Scapula*, not unlike the *Ligamentum Latum* of the *Coxa*, to prevent Luxations.

Their Uſe is, by their ſucceſſive alternative Acting, to move the Arm circularly.

CHAP. XXVI.

Of the Muſcles of the Cubit.

THE inferior Part of the Arm, or the fore Arm, *viz.* from the Elbow to the Wriſt, is called the *Cubit*, and is either bended or extended by five Muſcles, *viz.* the *Biceps*, *Brachiæus internus*, *Gemellus*, *Brachiæus externus*, and *Anconæus*.

The *Biceps* has received its Name, from its having two Heads or Originations; the firſt or exterior has its Riſe with a long round Tendon, from the ſuperior Part of the Edge of the *Acetabulum* of the *Scapula*, and ſtretches under the Ligament of the Articulation in a Furrow or Channel on the Head of the *Os Humeri*, wherein it is cloſed by a proper Ligament. In its Deſcent it begins to become fleſhy, as it paſſeth under the Inſertion of the *Muſculus Pectoralis*, where expanding it ſelf into a large carneous Body, it unites with the other Head or Origine. The latter hath its Origination with a ſomewhat broad, flat and long Tendon at the Extremity of the *Proceſſus Coracoides* of the *Scapula*, and in its Deſcent cloſely adheres to the *Coracobrachialis*, (whence it is, that ſome Authors erroneouſly deſcribing that Muſcle among those of the Arm, have miſtaken it for a fleſhy Origination of this) but then parting from it both theſe Heads from one large carneous Belly, which growing tendinous near the Cubit, is generally believed to be implanted by a ſtrong round Tendon, to the Prominency at the ſuperior Head of the *Radius*. But I have diſcovered this Tendon to be double, the External of which being thin, did paſs obliquely over the *Muſculus Pronator Radii Teres*, and expanding it ſelf in the Nature of a Membrane, joins with the *Membrana Communis Muſculorum*; which encloſes all the external Muſcles of the Wriſt and Fingers.

The Uſe of this Muſcle is to bend the *Cubit*.

The double tendinous Inſertion of this Muſcle has not been mentioned by any Author as far as I know, but is very plain, and was taken notice of firſt by me ſome Years ſince in Diſſection, and appeareth immediately under the Skin and *Membrana adipoſa* of the Cubit.

The Uſe of this external Tendon, which we will call *Faſcia Tendinoſa*, ſeems to be not only for the more advantageous Elevation or bending of the Cubit, which it moves the more eaſily, by how much the more it recedes from the Centre of its Motion or *Fulcimen* at the inferior Part of the Arm-Bone, and approaching to its other Extream; but alſo incloſing all the external Muſcles of the *Radius*, *Carpus* and Fingers, it thereby corroborates them in the Perfor-

manc

ance of those vigorous Functions they are
necessity employed in; like we see
me laborious Mechanicks make use of ar-
ficial Bandages made of Leather, which
ey adapt to the belly'd Part of the Muscles
the Cubit, in turning and rasping of
rd Woods.

Due regard ought to be had to the *Ductus* these external tendinous Fibres in letting Blood, so as to direct the Launcet ac-rding to their Length, to avoid too great Division of them, which oftentimes is at-nded with very ill Consequences.

I know a Woman, who having strained r Arm with wringing wet Linnen loaths, suspected she had dislocated the rm at the Shoulder; but upon Examina-on, observing a Depressure on the exterior rt of the *Musculus Deltoides*, and finding e two inferior Tendons of the *Biceps* ri-d, and the *Cubit* thereby deprived of its e Extension, I suspected that the external ndinous Origination (before mentioned) as slip'd out of its Furrow or Channel in e *Os Humeri*; and perceiving the Part in-ning to an Inflammation, I advised her to ke an Application of some Emollients, d not to make use of it till next Morning, which Time our Conjecture was found e; for by turning the whole Arm to d fro, it readily slip'd it into its Place, d the Woman recovered the Use of the rt immediately.

The *Brachiæus Internus* has obtained its me from its Position, which is partly der the next preceding. Its Rise is fleshy m the interior Part of the *Os Humeri*, at Implantation of the *Deltoides* and *Cora-rachialis* Muscles, and descending over Articulation of the Cubit with the *Os meri*, has its Insertion partly fleshy and tly tendinous, to the upper and fore Part he *Ulna*.

The Use of this Muscle is also to bend *Cubit*.

The *Gemellus* having obtained its Name m its double Origination, has its Rise t tendinous from the upper Part of the erior *Costa* of the *Scapula* internally; and it takes its Course between the two nd Muscles, it becomes fleshy, and in Descent is join'd with its other Origina-, which ariseth broad and carneous from the superior and posterior Part of the *Os Humeri* under the *Musculus Deltoides*, and being tendinous on the exterior Side, and fleshy on the interior, is so implanted into the upper and exterior Part of the *Ulna*, called the *Olecranum* and *Ancon*, or the Elbow.

The Action of this Cubit is to extend the *Cubit*; if you take a narrow View of the two Origines of this Muscle, you will find them interwoven with divers *Series* of Fibres, whereby it is enabled to perform the Extension of the Cubit with the more Force.

The *Brachiæus Externus* seems to be a third Origination of the former Muscle, its Rise being continued from above the Middle of the lower and posterior Part of the *Os Humeri* to its Cavity, which receives the *Olecranum* in the Extension of the Cubit, where being conjoin'd with the tendinous exterior Part of the former, it has its Insertion with it.

The *Anconæus*, so named by *Riolan* from its Position.

Its Rise is fleshy from the lower and posterior Part of the *Os Humeri*, and becoming larger in its Passage between the superior Ends of the *Ulna* and *Radius*, has its Insertion into the lateral Part of the former, about a Thumb's length below the *Olecranum*.

The Use of this Muscle is likewise to extend the *Cubit*.

The next Muscles that offer themselves in Dissection, are those of the Palm of the Hand, which therefore must proceed in the Demonstrations those of the Wrist, Fingers and *Radius*.

CHAP. XXVII.

Of the Muscles of the Palm of the Hand.

THE *Palmaris longus* is the only Muscle belonging to the Palm of the Hand, mentioned by the ancient Authors; but *Fallopius* has left us a Description of another called the *Palmaris brevis*.

The first of these Two has an acute Origination, from the interior Protuberancy of

the *Os Humeri*, and ſoon growing into a fleſhy Belly, and contracting it ſelf again to a long, flat, ſlender Tendon, paſſes obliquely with the Tendon of the *Flexor ſuperior Carpi*, and ſtretching over the *Ligamentum Annulare*, there expands it ſelf, and adheres cloſely to the Skin of the Palm, having its Inſertion to the Roots of the Fingers laterally, it being there divided to give Paſſage to the Tendons that bend them.

The Obſervation made by *Columbus* concerning the Origine of this Muſcle, from the Prominency of the *Os Humeri*, *viz.* that it is ſometimes wanting, is agreeable to Experience.

Its Uſe is, to be ſubſervient in forcibly graſping any tactile Body, and to ſhelter the ſubjacent Muſcles from external Violences.

The Second, or the *Palmaris brevis*, is called alſo the *Caromuſculoſa quadrata* by *Spigelius*. The Authors have left us very erroneous Opinions, as well concerning the Riſe, as the Uſe of this Muſcle; for its Origination is not from the *Membrana carnoſa*, as *Columbus* aſſerts; nor from the eighth Bone of the Wriſt, as *Fallopius* will have it; but it ariſeth with a broad Membrane-like Tendon, from the external Part of the *Os Metacarpi* of the little Finger, and one of the Bones of the Wriſt, whence aſcending over the *Abductor minimi Digiti*, it turns into a fleſhy diſgregated carneous Muſcle, taking its Paſſage under the tendinous Expanſion of the next preceding in the Palm, and is implanted by a ſhort ſtrong Tendon into the eighth Bone of the Wriſt.

Spigelius pretends, that when this Muſcle acts, it extends the Hand when we open it; but this Action being not performed by any proper Muſcle, but by the common *Extenſores* of the Fingers, the true Uſe of this Muſcle is to draw the *Mons Lunæ* towards the *Os Metacarpi* of the little Finger, whereby the Palm becomes hollow.

CHAP. XXVIII.

Of the Muſcles of the Four Fingers.

THeſe Muſcles may be moſt properly diſtinguiſhed into *Common* and *Proper*.

The *Common* are called thoſe Muſcles of the Fingers, which having their Originations from the external or internal Prominencies of the *Os Humeri*, and being ſubdivided afterwards, have their Inſertions moſt, if not all the Fingers, *viz.* the *Perforatus*, *Perforans*, *Lumbricales* and *Extenſor Communis Digitorum*.

But the *Proper* Muſcles belonging to the Fingers, are ſuch as have their Origines diſtinct, and their Implantations without any Sub-diviſion into each reſpective Finger, *viz.* the *Interoſſei*, the *Extenſor* and *Abductor Indicis*, and the *Abductor Minimi Digiti*.

The Firſt among the *Common* Muſcles is the *Perforatus*, having received its Name from the Perforations of its Tendons, to give Paſſage to thoſe of the following Muſcles, in order to their Implantations. It has alſo obtained the Name of the *Subli-* from its Situation above the following, and of the *Flexor ſecundi Internodii Digitorum* from its Uſe.

Its Origination is tendinous from the interior Protuberancy of the *Os Humeri*, between the *Flexores Carpi*; it has alſo disgregated fleſhy Origine from the anterior Part of the *Radius*, between the *Pronator Radii Teres*, and *Flexor Pollicis Magnus*, and forming a fleſhy Belly, becomes leſs before it has made half its Progreſs, where being divided into four carneous Portions, each of them ſoon becomes ſo many roundish Tendons, which are incloſed in their proper mucilaginous Membrane, as they take their Paſſage under the *Ligamentum Tranſverſum* of the *Carpus* thro' the Palm; near the firſt Internode of the Fingers, each Tendon is parted aſunder, to give Paſſage to thoſe of the following Muſcle, then joining, and ſub-dividing again immediately before their Implantation to the upper Part of the ſecond Bone of each Finger.

This and the following Muſcle are moſt exactly repreſented by *Bidloe*, *Tab.* 67.

The *Perforans* has obtained its Denomination, becauſe its Tendons do perforate or paſs through thoſe of the next preceding Muſcle: They have alſo given it the Name of *Profundus* from its Situation under the precedent; and the *Flexor tertii Internodii* of the Fingers, from its Uſe.

It has its Riſe fleſhy from near two
irds of the upper and fore Part of the
na, as likewiſe from the Ligament betwixt
laſt named Bone and *Radius*, growing
o a large thick bellied Muſcle becomes
dinous outwardly, before it ſtretches
er the *Pronator Radii Quadratus*, and be-
ſeparated into four round Tendons,
ſe take their Paſſage under the next pre-
ing Muſcle, beneath the *Ligamentum*
nſverſale before mentioned (from each of
le Tendons the *Muſculi Lumbricales* are
d to have their Riſe): After which, they
e their Paſſage thro' the Fiſſures of the
mer, and running over their Extremi-
, have their Implantations in the upper
d fore Part of the third Bone of each
nger.

The Tendons of this Muſcle paſſing thro'
oſe of the next precedent, is a moſt ad-
rable and moſt uſeful Contrivance of
ture.

For, that the Fingers (like ſo many Lea-
rs) might be bended with an extraordina-
Force, it was abſolutely requiſite the
ongeſt Muſcle ſhould have its Implanta-
n neareſt their Extremities, and fartheſt
m the *Oſſa Metacarpi* which are their
cimina; but conſidering that each Inter-
node was to be attended with a peculiar
uſcle, the better to adapt them for their
ious Functions, and the Origine of the
perior or the *Perforatus*, is confined to the
nt of the internal Protuberancy of the
Humeri, and the ſuperior Part of the
dius only, and therefore could not be a
Inſtrument for ſo vigorous an Action,
d that not only in reſpect of its Magni-
de, but alſo by the approach of its two
treams, when the *Cubit* or *Carpus* are
nded; both which would prove no ſmall
pediment in divers Actions, and there-
e it was neceſſary it ſhould exert its
tions or Functions in the Motions of the
ond Internodes. But in regard that theſe
perior Tendons would be apt to interrupt
intercept the inferior in their right Paſ-
e or Progreſs to the Extremities of the
gers, it diſcovers a ſingular providential
ntrivance in Nature, in tranſmitting the
ter thro' the *Fiſſures* of each of the next
ceding, by which Means the Functions
both are not only diſtinctly accompliſhed,
and the Extremities of the Fingers attended with the largeſt Muſcle (whoſe Origine is below the *Os Humeri*, whereby its Extreams can't approach in the Flexion of the Cubit) but alſo their Motions are preſerved entire, notwithſtanding the ſuperior Muſcle is totally divided by a moſt provident Contrivance of the Author of Nature.

The *Lumbricales* have received their Denomination from their Figure, becauſe they reſemble the *Lumbrici Terreſtres* or Earth-worms, they are called alſo the *Flexores primi Internodii Digitorum* from their Uſe. We told you before, that the Authors do moſt commonly derive the Riſe of theſe Muſcles from the Tendons of the next preceding, but in the late Diſſection of a Subject, we obſerved Part of that *Muſculus Lumbricalis* belonging to the Fore-Finger had a diſtinct carneous Origine, and a long ſlender Tendon ſituated betwixt the two preceding; which made us imagine that the other Three, and thoſe of other Subjects, have their Originations in common with the *Perforans*, and joining with its Tendons, are afterwards divided again, and becoming fleſhy, proceed to their tendinous Inſertions with the *Muſculi Interoſſei*, at the firſt Internode of each Finger externally laterally next the Thumb.

We ſuppoſe theſe Muſcles to perform thoſe minute Motions of the Fingers, when the ſecond and third Internodes are curvated by the two laſt before deſcribed Muſcles, and therefore uſed in playing on Muſical Inſtruments, whence they might not improperly be called the *Muſculi Fidicinales*.

The *Tenſor Digitorum ſeu Extenſor Digitorum Communis*, ariſes with an acute tendinous Beginning, from the exterior Protuberancy of the *Os Humeri*; it grows fleſhy betwixt the *Extenſores* of the *Carpus*, being in leſs than half its Progreſs ſeparated into three Portions, which turn into ſo many Tendons (the Middlemoſt of which is the longeſt) and taking their Paſſage under their annular Ligaments, between the inferior Parts of the *Ulna* and *Radius*, do ſtretch ſeparately over the Back of the Hand, and ſending for the tendinous Filaments to each other, as they run over the firſt Internodes of each Finger, are afterwards implanted into

into the upper Parts of the firſt, ſecond and third Bones of the fore, middle and third Fingers. The Extenſion of the Fingers being performed without any Force, 'tis no Wonder if the Muſcles deſigned for that Function are no larger in Proportion to their Antagoniſts.

The next in order of Diſſection, are the *proper* Muſcles appertaining to the Fingers, among which challenge the firſt Place,

The *Interoſſei Manus*, which are diſtinguiſhed into the *External* and *Internal*, having received their Denominations from their Situation. Some Anatomiſts reckon ſix, others eight, of theſe Muſcles, amongſt which they number the *Abductor minimi Digiti* and *Indicis*, but conceiving that the two laſt named don't deſerve theſe Denominations, the firſt Opinion ſeems to be moſt conſonant to Truth. They have their Originations fleſhy internally in the Palm, from the upper Parts of the Bones of the *Metacarpus* next the Wriſt; whence deſcending betwixt theſe laſt named Bones, they become tendinous at the firſt Internode of each Finger laterally, and paſs to their Implantations with the next preceding Muſcle. Each Interſtice of the *Oſſa Metacarpi* is occupied by two Muſcles, which have their Implantations into the Sides of the Fingers.

When all theſe *Muſculi Interoſſei* are in Action together, they pull the Fingers nearer each other, and are ſubſervient to their Extenſion; at which time, they in Conjunction with the *Abductor Indicis* and *Minimi Digiti* are capable of divaricating the Fingers, which Action is not without ſome Difficulty performed by them when they are bended.

The *Extenſor Indicis ſeu Indicator* has its Riſe fleſhy, from the Middle of the exterior Part of the *Ulna* next the *Radius*, immediately below the *Extenſores* of the Thumb, and in its oblique Deſcent growing tendinous as it runs under its annular Ligament and the inferior Part of the *Radius* and the Wriſt, it ſtretches over the *Os Metacarpi* of the *Index*, and joining with the Tendon of the *Extenſor Communis*, has its Inſertion with it into the third Bone of the fore Finger. Its Tendon is ſometimes divided.

The Uſe is, according to its Name, to extend the *Index*.

The *Abductor Indicis* does not appear [illegible] the *Abductor Pollicis* is raiſed, and numbered among the *Interoſſei* by ſome, as has been mentioned before. Its Origine is fleſhy from the *Os Metacarpi* that ſuſtains the fore Finger, and deſcending over the firſt Internode of the ſaid Finger, turns tendinous, joining with the Tendon of one of the *Muſculi Lumbricales*, has its Inſertion together with it, and with the Tendon of the next preceding Muſcle.

Its Name declares its Uſe, in drawing the fore Finger from the reſt.

The *Extenſor Minimi Digiti* has its Riſe partly tendinous at the Extremity of the exterior Proceſs of the *Os Humeri*, and partly carneous from the upper Part of the Ulna between the *Extenſor Communis* of the Fingers, and the *Muſculus Ulnaris Externus*, and growing tendinous in its Paſſage under the annular Ligament at the Wriſt, is there parted in two and ſometimes three Tendons, which are reunited at its Implantation into the upper Part of the third Bone of the little Finger. Its Function, according to its Name, is to extend the little Finger.

The *Abductor Minimi Digiti* does appear in ſome Subjects divided into two or three Muſcles, each being provided with a different Order of Fibres. The *Firſt* ſeems to be a *Flexor* of the firſt Internode of the little Finger; the *Second*, an *Abductor* of the ſame, and the *Third* an *Abductor* of the ſecond and third Internode; but this Diviſion not being not always ſo, the moſt general Way is to treat of it as one ſingle Muſcle, the multiplying of Muſcles, which has been with ſo much Induſtry attempted by ſome Anatomiſts, ſerving only to introduce a Confuſion among them.

Its Riſe is fleſhy; *Firſt*, From the *Ligamentum Tranſverſale*, and fourth Bone of the Wriſt; *Secondly*, From the third Bone of the Wriſt; and, *Laſtly*, from the upper Part of the ſubjacent Bone of the *Metacarpus*. The two Firſt are, and continue carneous to their Implantations, the firſt having its Termination at the upper Part of the firſt Bone of the little Finger forward, the latter ending at the ſame Part of the

e Bone laterally; the Third growing linous like the interoſſeous Muſcles, has inſertion like them, with the Tendon of *Extenſor* of the little Finger, at the up- Part of the third Bone of the little Fin-

CHAP. XXIX.

Of the Muſcles of the Thumb.

HE Authors don't agree concerning the Numbers, Originations and Implanta- s of the Muſcles appertaining to the mb, which in a great Meaſure proceeds that great variety which is frequently rved in divers Bodies in Diſſecting; ntend to demonſtrate them as they have commonly appeared to us.

ee *Flexor Tertii Internodii ſeu Longiſſimus us*, is frequently obſerved to have a ble Origine; the firſt and ſuperior of h has its Riſe acutely from the interior uberancy of the *Os Humeri*, between *Perforatus* and the *Perforans*, becoming a ous Belly, and the tendinous joins the middle Tendon of its other larger ; the ſecond or inferior Origination of Muſcle (being that Part which is moſt nonly deſcribed by the Anatomiſts) s Riſe with a double *Series* of carneous s for ſome ſpace on the *Radius* from diately below its upper Part, which ng in a middle Line or Tendon (not e the *Fibrilla* of a Feather joining to *Stamina*) it paſſes over the Articula- f the Wriſt, and grows entirely tendi- in its Paſſage over the *Flexor Primi undi Internodii*, to its Inſertion at the Part of the third Bone of the nb.

the more convenient Adminiſtration reſt of the Muſcles belonging to the b, it is requiſite you ſhould raiſe the *lus Abductor Pollicis*

Abductor Pollicis has its Origination and fleſhy, from the interior Part of *igamentum Tranſverſale* of the Wriſt, e deſcending it becomes leſſer, and tendinous at its Inſertion into the and exterior Part of the ſecond Bone Thumb laterally.

Its Name ſhews its Uſe, in drawing the Thumb from the Fingers.

The *Flexor Primi & Secundi Oſſis Pollicis*, is a large diſgregated Muſcle, having its Riſe from the *Ligamentum Tranſverſale* of the Wriſt, and the Bones of the Wriſt at the *Baſis* of the *Mons Lunæ*, and the *Os Metacarpi* of the middle Finger; thence paſſes on to its Implantation, partly into the *Oſſa Seſamoidea* of the ſecond Internode, and partly into the firſt Bone of the Thumb. This is diſtinguiſhed into three, according to *Veſalius*, and *Bidloe* has repreſented it, *Tab. 68. M, N, N, O, O, P.*

The Actions of this Muſcle are different, according to the various Diſpoſition of its *Series* of Fibres, ſo that it bends the firſt or ſecond Bones of the Thumb, either directly or obliquely, towards the Wriſt and the Palm of the Hand.

The *Abductor Pollicis* has its Riſe in common with the *Abductor Indicis*, and growing fleſhy, aſcends obliquely to its broad Inſertion at the upper Part of the firſt Bone of the Thumb.

Its Uſe is to draw the Thumb nearer to the fore Finger.

The reſt of the Muſcles deſigned for the Motions of the Thumb are *Extenſores*; of theſe, the Generality of the Anatomiſts reckon no more than two: But ſince, to the beſt of our Memory, we never did meet with fewer than three in Diſſection, we will give you the Deſcription of three diſtinct fleſhy Muſcles, eſpecially ſince the Figures (which ſeem to be done after the Life) in *Veſalius* and *Bidloe*, do repreſent them as ſuch.

The *Extenſor Primi Internodii Pollicis* has its Origination tendinous from the ſuperior Part of the *Ulna*, immediately below the *Supinator Radii brevis* ſoon growing fleſhy, but becomes tendinous again in its Deſcent obliquely over the Tendons of the *Radialis Extenſor*, and has its Inſertion into the ſuperior Part of the firſt Bone of the Thumb: This we have found ſometimes divided into two, and ſometimes into three diſtinct Muſcles.

The *Extenſor Secundi Internodii Oſſis Pollicis* has its Riſe broad and fleſhy, from that part of the *Radius* which is next the *Ulna*, and growing tendinous, takes its Paſſage under

under the ſame Involucre with the Tendons of the former, to its Inſertion into the upper Part of the ſecond Bone of the Thumb.

The *Extenſor Tertii Internodii Oſſis Pollicis* has a broad partly tendinous, but for the greateſt Part fleſhy Beginning from the *Ulna*, immediately below the Origine of the *Extenſor Primi Internodii*, or betwixt it and the *Indicator*, as alſo from the Ligament between the laſt named Bone and the *Radius*, where in its oblique Deſcent it becomes tendinous as it extends its ſelf in a proper *Sinus* on the lower Appendage of the *Ra-us*, wherein it is incloſed by its annu- Ligament, and takes its Paſſage over t two Tendons of the *Radialis Extenſor*, to Implantation in the ſuperior Part of third Bone of the Thumb.

The Uſe of this Muſcle is not only extend the Thumb, but alſo to draw ſomewhat backwards; inſomuch, that ſo can bring it on the upper and back Part the Bones of the *Metacarpus*.

The Explication of the Figure, repreſenting all the Muſcles of the Hinder-P of the Trunk of the Body. From Mr. St. Hilaire.

a, a. The *Muſculus Complexus* of the Head.
B, B. The *Splenique* or *Maſtoidæus*.
C, C. The *Levator* of the *Scapula*.
D. The *Trapezius* in its Situation.
E. The *Supraſpinalis*.
F. The *Infraſpinalis*.
G. *Rotundus major*.
h. *Rotundus minor*.
I, I. *Rhomboides*.
K, K. The *Serratus major*.
L. The *Serratus Superior Poſticus*.
M. The *Serratus Inferior Poſticus*.
N, N. *Longum Dorſi*.
O, O. The *Sacrolumbaris*.
P. The *Quadratus*.
Q. The *Muſculus Sacer Dorſi*.
R. *Muſculus extenſor Brachii*, calld long Muſcle.
S. The other Extender of the Arm, c the Short one.
T, T. The *Supinator Brachii*.
V. The firſt Extender of the Wriſt, the *Brevis*.
W. The other Extender of the Wriſt.
x, x, x, x. The two Extenders of the F gers.
Z. The external *Apophyſes* of the Shou
Δ. The *Deltoides*.
τ. The *Brachialis*.

The following Characters repreſent the Muſcles of the lower Parts.

A. The great Bender out of Place.
B. The leſs Bender in its Situation.
C. The *Piriformus*.
D. The *Obturator internus*.
E, E. The *Semimembranoſus*.
F, F. The *Seminervoſus*.
G. The Flank.
h, h. The Inſide of the Thigh.
i, i, i. The *Triceps* in the right Side.
Δ, Δ, Δ. The *Triceps* on the left Side.
L, L. The *Popliteus*.
M, M. The two *Gemelli* of the left F
N, N. The *Solæus*.
O. The *Plantaris*.

CHA

CHAP. XXX.

the Muſcles of the Carpus, *or of the Wriſt.*

These Muſcles are generally well enough deſcribed by the Anatomiſts, and have ained their Denominations from their nation and Uſe.

The *Flexor Carpi Radialis* has a tendinous gination from the interior Protuberancy the *Os Humeri*, and growing fleſhy, ad- es cloſely to the *Pronator Radii Teres*, l in half its oblique Proceſs to the Wriſt urns into a flat Tendon, which paſſing r the annular Ligament, has its Inſertion o the ſuperior Part of the *Os Metacarpi*, ich ſuſtains the fore Fingers.

The *Flexor Carpi Ulnaris* has a tendinous e from the ſame Protuberancy of the *Os meri* with the next preceding, as alſo n the upper and exterior Part of the *Ul-* where the *Muſculus Perforans* has its gine, and running on fleſhy according the Length of the *Ulna*, is implanted tly by a ſhort ſtrong Tendon into the rth Bone of the *Carpus*, and partly into Bone of the *Metacarpus*, which ſuſtains little Finger.

ts Uſe is declared by its Name.

The *Extenſor Carpi Radialis*, called by e the *Bicornis*, as alſo the *Radiæus exter-* has two Originations, ſo that they ſeem e two diſtinct Muſcles; the Exterior ng its Riſe fleſhy above the external uberancy of the *Os Humeri*, immediate- below the *Supinator Radii Longus*, grows a fleſhy Belly in its Deſcent, and becomes inous above the Middle of the *Radius*. Second of this Muſcle being partly eous and partly tendinous below the ner, either from the Point of the Protu- ncy of the *Os Humeri*, or the ſuperior of the *Radius*, and continues fleſhy what lower than the Superior; both dons taking their Paſſage under the *nſores Pollicis*, march under the annular ment, and have their Inſertion into pper Part of the Bones of the *Metacar-* of the fore and middle Fingers.

The *Extenſor Carpi Ulnaris*, has an acute tendinous Origination from the exterior Protuberancy of the *Os Humeri*; in its Deſcent it grows fleſhy, according to the Length of the *Cubit*, becoming tendinous again as it paſſes over the lower Part of the *Ulna*, and taking its Courſe under the *Ligamentum annulare*, has its Implantation into the upper Part of the Bones of the *Metacarpus* of the little Finger.

When this Muſcle and the *Ulnaris Flexor* are in Action, they draw the Hand ſideways towards the *Ulna*, and in the ſame Manner, in caſe the *Radialis Flexor* and *Extenſor* are in Action, they move it towards the *Radius*.

It is a very true Obſervation made by moſt Anatomiſts, that the Muſcles *Extenſores*, whether appertaining to the Fingers or to the Wriſt, have their Riſe from the exterior Protuberancy of the *Os Humeri*, and that the *Flexores* their Antagoniſts from the interior Prominency of the ſame Bone, was likewiſe from the ſuperior and external Part of the *Ulna*, next the *Anconæus*.

CHAP. XXXI.

Of the Muſcles of the Radius.

THE *Radius* has its Motion in *Common* with the *Ulna* or *Cubitus*; but beſides that, it has alſo a *proper* Motion, in which the Wriſt, together with the Hand, is chiefly moved or turned upwards and downwards by Pronation and Supination; to which end there are two ſorts of Muſcles, of which thoſe that turn it inwards, and the Palm of the Hand downwards, are called *Pronatores*, and the others which turn it outwards, and the Palm of the Hand upwards, are termed the *Supinatores*, having received their Denominations from their Figure and Uſe.

The *Pronator Radii Teres*, by ſome called the *Pronator Superior Rotundus*, has a fleſhy Origination from the exterior Protuberancy of the *Os Humeri*, where the *Flexores* of the Wriſt and of the Finger have their Riſe, and adhering cloſely to the *Flexor Carpi Radialis*, it ſtretches downwards with an

oblique Deſcent, to its carneous Implantation a little above the Middle of the *Radius* externally.

The *Pronator Radii Quadratus*, by ſome called the *inferior Quadratus*, has a broad and fleſhy Riſe from the inferior and interior Part of the *Ulna*, and taking its Paſſage tranſverſedly over the Ligament that conjoins the *Radius* with the *Ulna*, is ſo implanted into the upper and exterior Part of the *Radius*.

The *Supinator Radii Longus*, has a broad and fleſhy Origination from the upper and exterior Part of the *Os Humeri*, three Fingers breadth below the Inſertion of the *Muſculus Deltoides*, and as it deſcends obliquely Inwards, it gradually leſſens it ſelf, becoming a flat broad Tendon, which nevertheleſs becomes narrower, till it is implanted at the exterior and lower Part of the *Radius* near the Wriſt.

The *Supinator Radii Brevis*, his Origination is partly tendinous and partly carneous, from the upper and exterior Part of the *Ulna* next the *Radius*, and taking its Paſſage obliquely tranſverſe over that Bone, is ſo implanted to its ſuperior Part below the Protuberancy of the *Radius*, where the round Tendon of the *Biceps* has its Implantation.

The next in due Order are the Muſcles of the Thigh, Leg and Foot.

Riolan reproves *Gaſpar Bartholin* for Maleadminiſtration of the Muſcles of the Leg before thoſe of the Thigh, alledging that thoſe of the former may be all demonſtrated, tho' the latter remain untouch'd; but notwithſtanding all his Allegations in Relation to that particular, it is abſolutely neceſſary to ſeparate divers Muſcles of the *Tibia*, as well as to cut off ſome of thoſe that move the *Os Femoris* it ſelf, before a tolerable View may be had of the others, eſpecially the *Rotator Femoris extrorſum*.

However, conſidering that ſome Muſcles which belong to the Thigh have their Riſe from the *Vertebræ* of the Back, Loins, and *Os Sacrum*, we will begin with them firſt, and then divide the *Os Ilium* from the *Os Sacrum*, and then remove the Trunk of the Body, a Thing very commodious in Diſſections, and not only becauſe a Limb is much eaſier to be managed and turned upon a Table, but alſo in regard thereby the nauſeous Sweat which is apt to ariſe from the Trunk may be avoided.

This done, go on in your Operation, diveſt the remaining Muſcles of their common Integuments, *viz.* the Skin, Fat, and Membranes; but in ſuch a Manner as to take care not to wound the *Faſcia Membranoſa* of the Thigh and Leg. You muſt alſo take off all the Fat on the Sole of the Foot, and be cautious leſt you cut the long Tendon of the *Muſculus Plantaris* in its Deſcent inwardly by the great Tendon of the *Gaſtrocnemii*, near the *Os Calcis*.

CHAP. XXXII.

Of the Muſcles of the Thigh.

THere is no ſmall difference among the Authors concerning the Number, Deſcription and Functions of the Muſcles belonging to this Part. *Galen*, *Veſalius* and *Columbus* make mention often, *viz.* the *Pſoas*, the *Iliacus internus*, *Pectinæus*, *Glutæus major*, *Glutæus medius*, *Glutæus minor*, *Pyriformis*, *Marſupialis*, *Triceps* and *Obturator Externus*. *Fallopius* has accounted this Number by another, called the *Quadratus Femoris*, tho' *Riolan* aſcribes the Invention of this Muſcle to *Sylvius*, and gives us a Deſcription of another, unto which he has given the Name of *Pſoas parvus*, its Situation being under the *Pſoas magnus*. To which *Bartholin* has added yet another different from that deſcribed by *Riolan*, the Poſition of which is beneath it, having the ſame fleſhy Origination about three Fingers breadth, and is ſo inſerted to the upper Edge of the *Os Ilium* backwards, where the *Iliacus internus* has its Riſe. He ſays he found it thus in a robuſt muſcular Body in the Year 1651; and the following Year, ſays he, he ſaw it with *Michael Lyſer*, who had obſerved it in a Monkey, to be the *Pſoas major*.

That of *Riolan* we have frequently met with, tho' not in all Bodies, as *Riolan* himſelf has very well obſerved, but that of *Bartholin* we could never as yet diſcover in any; ſo that if ſuch be found, it is more probable that it ought rather to be

l to the Loins, together with the *Qua-*
ens Lumborum, of which it may very
ely be a Part, that may ſometimes appear
e a diſtinct Muſcle, as we meet with the
e *Luſus Naturæ* very often in other Caſes
this Nature, of which the *Rhomboides*
apulæ and the *Triceps Femoris* furniſh us
ith convincing Inſtances.

The *Pſoas parvus* ought properly to be
mbred amongſt the Muſcles appertaining
the Loins, yet in reſpect to its being Sub-
rvient to the *Pſoas Magnus*, and the more
mmodious Diſſection, we will give it a
ace here. It has its Riſe fleſhy, from the
per Part of the firſt *Vertebræ Lumborum*
ternally laterally within the *Abdomen*,
mediately below the Cavity of the *Dia-*
ragma, whence aſcending obliquely in-
ards towards the *Pelvis* of the lower Belly
here it cauſes to be carneous) it in a
anner embraces the *Pſoas Magnus*, and
s its Implantation with a thin, but broad
d ſtrong Tendon to that part of the *Os*
bis where it is conjoin'd with the *Os*
um.

When this Muſcle with its Fellow is in
ction, they are Aſſiſtant to the *Recti Abdominis*
drawing the *Oſſa Pubis* upwards; as when
e are raiſing our ſelves from a Cumbent
oſture, or as when the Rope-Dancers hang
their Hands, and raiſe the lower Parts
their Bodies to catch the Rope with their
et: And, tho' their proper Function is
bend their Loins, yet ſeeing their Ten-
ns do embrace the two following Muſcles,
hich have been often obſerved to ſtretch
er their ſuperior Parts, not unlike the
ſcia Tendinoſa Cubiti and *Lata* of the
igh, they do alſo aſſiſt and corroborate
em in their Action.

The *Pſoas Magnus ſive Lumbaris*, having
ceived its Name from its Situation, is a
ge, round and fleſhy Muſcle, which has
Origination from all the *Vertebræ Lumbo-*
m, and their tranſverſe Proceſſes internal-
laterally within the Cavity of the lower
lly, from whence it deſcends over the upper
rt of the *Os Sacrum* and Spine of the *Ili-*
, where it is join'd with the carneous
bres of the next following Muſcle,
herewith it is inſeparably united at their
rtly carneous and partly tendinous Im-
antations in the inferior Part of the leſſer
ochanter of the *Os Femoris*.

The Uſe of this Muſcle, is to be Aſſiſtant to the next following in its Function.

The *Iliacus Internus*, has its Riſe fleſhy from above half the ſuperior Region of the *Os Ilium* and its interior concave Part, and in its Deſcent over the inferior Part of the laſt named Bone is conjoin'd with the next preceding Muſcle, and has its Inſertion with it, as has been mentioned before, partly under the Implantation of the next following.

The Uſe of this Muſcle, is in conjunction with the next preceding, to move the Thigh forwards when we are walking.

The *Pectinæus* has received its Name from its Beginning at the *Os Pubis* or *Pectinis*. Its Origination is broad and fleſhy, from the exterior Part of the ſaid Bone, between the two next preceding Muſcles and the ſecond Head of the *Triceps*, and in its Deſcent obliquely backwards it grows into a flat ſtrong Tendon, near its Inſertion into the Inequality of the poſterior Part of the *Os Femoris*, immediately below the leſſer *Trochanter*. at the Implantation of the two former Muſcles.

In the Action of this Muſcle, in conjunction with the two next preceding, the *Os Femoris* is not only drawn upwards, but alſo directed outwards by its curved Deſcent from its Riſe to its Implantation into the poſterior Part of the *Os Femoris*, by a ſingular provident Contrivance of Nature; for ſince in Progreſſion the Thigh Bones do by their oblique Poſition, as it were, inforce the Toes to turn inwards, theſe three laſt deſcribed Muſcles, beſides the *Recti Abdominis* and the *Pſoas parvus*, are ſubſervient to the Inflexion of the Body, and the Direction of the whole Limb, to wit, the Thigh, Leg and Foot outward into a more graceful Step.

The next Muſcle that offers it ſelf to the Knife, is the *Muſculus Membranoſus*, which therefore muſt be raiſed, before we can come to view the remaining Muſcles that move the Thigh Bone. This may be performed either by cutting it from its fleſhy Origination at the Point of the Spine of the *Os Ilium*, and turning it downwards; or elſe, after you have well forced it from the Skin, Fat and Membrane, it may be raiſed contrariwiſe, by cutting off its tendinous

Implantation at the ſuperior Appendage of the *Fibula*, and clearing it of all the Muſcles of the *Tibia*, and then leaving it at its Origine.

Either of theſe being done, then proceed to ſeparate the *Pyriformis* from its Origination within the *Pelvis* of the lower Belly, and part of the carneous Origine of the *Glutæus major*, from the exterior Part of the *Os Sacrum* and *Coccygis*. The Body being then laid in a ſupine Poſture with the Legs divaricated, you may then ſeparate with a thin Knife the *Os Ilium* from the *Sacrum*.

The *Glutæus major* has received its Name from its being the largeſt Muſcle of thoſe that compoſe the Buttocks. Its Origination is large and of a ſemicircular Figure, forwards entirely tendinous from near two Thirds of the exterior Part of the Spine of the *Os Ilium*, but backwards its Origine is thick and fleſhy from the poſterior Part of its Spine, and hindmoſt of the *Os Sacrum* laterally, and the whole *Os Coccygis*, as likewiſe from a broad Ligament, which is extended between theſe two laſt named Bones and the Protuberancy of the *Os Iſhium*. Its carneous diſgregated Fibres deſcending almoſt ſemicircularly, grow tendinous as they approach the great *Trochanter*, where it is conjoined with its juſt now deſcribed tendinous Origination, deſcending over the exterior Part of the great *Trochanter*, after being joined with the Tendon of the *Membranoſus*, proceeds to cover and cloſely embrace all the exterior Muſcles of the *Tibia*, in the ſame Manner as the external Tendon of the *Biceps* does thoſe of the *Cubit*; but the other Part of it, which proceeds from the fleſhy Body of this Muſcle, has a large Implantation in the *Linea Aſpera*, on the poſterior Part of the *Os Femoris*, near four Inches in breadth, below the great *Trochanter*.

The Office of the firſt deſcribed tendinous Origination of this Muſcle doth not only ſerve to ſupport its fleſhy Body, but alſo its Fibres interſecting thoſe of the *Membranoſus*, as they cover all the Muſcles of the *Tibia*, do more adequately incloſe them, whereby they are corroborated in their Action. When this Muſcle acts, it draws the Thigh directly backwards.

The *Glutæus Medius* has its Situation chiefly under the tendinous Origination of the next preceding Muſcle; its Riſe is fleſhy from almoſt the whole exterior Part of the Spine of the *Os Ilium*, and in its Deſcent becoming thicker and fleſhy, has its Inſertion by a ſtrong Tendon into the upper and exterior Part of the great *Trochanter*, in a ſemicircular Figure. Concerning the true Uſe of this Muſcle, if we conſider the various Orders of its Fibres, it will be manifeſt from their Poſition, that they are not ſo uſeful in the Extenſion of the Thigh, as the Anatomiſts would have it, but that its Function is rather to turn the Thigh outwards: This will be plainly apparent if in Diſſection you give the Thigh that Motion, for then you may ſee the fore Part of this Muſcle remarkably relax'd. And in living Bodies, whenever the Thigh is turned outwards, you may obſerve it to be tumefied. Or, if in performing that Motion with your own Thigh, you hold your Thumb upon this Muſcle, you will feel it move or contract under the Skin. Beſides its being in ſome meaſure Aſſiſtant in the Extenſion of the Thigh, together with the former Muſcle, it is likewiſe imployed in divaricating the Legs, in which Functions it cooperates with the *Muſculus Membranoſus*.

The *Glutæus Minor* has its Poſition altogether under the next preceding Muſcle, and is ſo much leſs than the next precedent, as that is to its next preceding. Its Riſe is ſemicircular, broad and fleſhy, from the *Dorſum Ilii*; from whence its carneous Fibres do deſcend to their partly fleſhy, partly tendinous Implantation like the precedent, at the ſuperior Part of the Root of the great *Trochanter*.

The Fibres of this Muſcle making parallel with thoſe of the next preceding, are Aſſiſtant to it in all its Functions, like now the Anatomiſts have been pleaſed to tell us a great many things concerning an *Obturator Femoris Introrſum*; but upon due examination we are fully ſatisfied, that there is no other Muſcle employed in that Office, but the fore Part of theſe two only. They alſo contribute their Share in rendring the Articulation of the *Os Femoris* with the Coxa more firm and ſtable in ſtanding erect.

he *Pyriformis ſeu Iliacus Externus*, has ined its firſt Denomination from its Fi- , and the ſecond from its Poſition. Origination is round and fleſhy from the ior and interior Part of the *Os Sacrum*, re it reſpects the *Pelvis* of the lower , and deſcending obliquely in the great of the *Os Ilium* above the acute Pro- of the *Os Iſhium*, and joining with the *eus Medius*, has its Implantation by a d Tendon at the ſuperior Part of the of the great *Trochanter*.

he Uſe of this Muſcle, is to move the *emoris* ſomewhat upwards, and to turn twards.

he *Marſupialis ſeu Burſalis*, has received ame from its tendinous paſſing through t were) a ſecond fleſhy Origine of it which Duplication reſembles unto a e. It has alſo obtained the Name of *rator Internus*, not from its Uſe, as will have it, but from its Situation. iſe is broad and fleſhy, from that Part e *Os Ilium*, *Iſhium*, *Pubis*, and the Liga- that is expanded on the great *Fora-* of the two laſt named Bones internal- nd paſſing tranſverſedly in the *Sinus* of *ſhium* (fenced on each Side by two Pro- , the one Acute, and the other Ob- where it is externally fleſhy, but in- lly it is provided with three and times four Tendons, which take their ge in ſo many diſtinct Furrows or nnels in the ſaid *Sinus*, like ſo many ls in a four-double Pulley, where it s with the other carneous Origine, its *Marſupium* or Purſe, having its from the aforeſaid acute and obtuſe eſſes, which joining with the ſaid Ten- at their united Implantation to the ior Part of the Root of the great *Tro- er*, near the Inſertion of the next prece- Muſcle.

olan diſtinguiſhes the *Marſupium* into Muſcles, for which he is reprehended *Lachetter*, who think the *Marſupium* a liar *Mechaniſm* of Nature, whereby Motion is confirmed, and the ſubja- Tendons defended againſt too heavy a ure.

the Action of this Muſcle, its Implan- n is directed towards that Part of the *m*, over which its Tendons run as it were over a Pulley, by which means the *Os Femoris* is turned outwards.

The *Quadratus Femoris* has received its Name from its Figure; its Riſe is broad and fleſhy from the Proceſs of the *Os Iſhium*, paſſing tranſverſedly with an equal Extent in breadth and thickneſs to its partly carneous partly tendinous Implantation, at the poſterior Part of the *Os Femoris* partly below the great *Trochanter*.

This Muſcle is an Aſſiſtant to the next preceding, in turning the Thigh-Bone outwards.

The next Muſcle appertaining to the Thigh, which appears at the poſterior Part of it and lies uppermoſt, is the largeſt Origination of the *Triceps*, which we reckon (contrary to others) the firſt Head of that Muſcle.

The *Triceps* has received its Name from its three Originations or Heads: The firſt and largeſt of them has its Riſe broad and carneous, from the inferior Edges and exterior Parts of the *Os Iſhium* and *Pubis*, where they are conjoined together, lying between the *Semitendinoſus* and *Semimembranoſus*, and that of the *Gracilis*, and deſcending with an oblique *Series* of fleſhy Fibres, has its Implantation partly tendinous and partly fleſhy near a Hand's length in breadth, to the *Linea Aſpera* of the *Os Femoris*, that is, immediately below the Implantation of the next precedent Muſcle; its inferior Part forming a ſtrong and round Tendon, is implanted to the ſuperior Part of the interior and inferior Appendage of the *Os Femoris*.

The *ſecond* Origine or Head of this Muſcle has its Riſe tendinous from the *Os Pubis*, but as it deſcends, ſoon grows fleſhy, and is conjoin'd with the next preceding, near to its Implantation to the middle Part of the *Linea Aſpera* of the *Os Femoris*.

The *third* Head or Beginning of this Muſcle ariſeth from the inferior Part of the *Os Pubis*, between the Origination of its laſt deſcribed Head and that of the *Pectinæus*, and deſcending obliquely, conjoins with the firſt near its Implantation to the *Linea Aſpera* of the *Os Femoris*, immediately above the Inſertion of the ſecond Head of this Muſcle.

This

This Muſcle in his Action produces various Motions in the Thigh, according to the Diverſity of its Originations: Thus the firſt deſcribed Part of it pulls the *Os Femoris* upwards, inwards, and ſomewhat backwards. The ſecond and third Origines of it pulls it more inwards, and turns it ſomewhat outwards, as when we put the Legs a croſs each other.

The *Obturator Externus*, is called alſo the *Rotator Femoris Extrorſum*, having obtained its firſt Name from its Situation, and the ſecond from its Uſe. It has a large fleſhy Origination from the exterior Parts of the *Os Iſchium* and *Pubis*, and the Membrane that is expanded on their *Foramen* externally oppoſite to the Origine of the *Marſupialis* or *Obturator internus* (treated of before), and taking its Paſſage tranſverſedly backwards, becomes leſſer, and grows tendinous at its Implantation to the Root of the great *Trochanter* of the *Os Femoris*, near the Inſertion of the laſt named Muſcle.

Its Uſe is to turn the Thigh outwards.

CHAP. XXXIII.

Of the Muſcles of the Leg.

GAlen, *Veſalius*, *Columbus* and *Spigelius*, number and deſcribe ten Muſcles moving the *Tibia*, *viz.* the *Membranoſus*, *Sartorius*, *Gracilis*, *Seminervoſus*, *Semimembranoſus*, *Biceps*, *Rectus*, *Vaſtus externus*, *Vaſtus internus*, and *Poplitæus*. Unto theſe, the later Anatomiſts have added another, which is placed between the two *Vaſti*, which they call the *Cruræus*. Among theſe, the ſeven firſt are reckoned *Common*, both to the Thigh and Leg, becauſe they have their Riſe either from the *Os Ilium*, *Pubis* or *Iſhium*, and have their Inſertions into the *Tibia* or *Fibula*, in moving of which, they move the Thigh at the ſame Time.

The other are *Proper*, having their Originations from the *Os Femoris* only, and their Implantations into the *Tibia*.

The *Membranoſus* has received its Name from the large Membranous Expanſion it is continuous with, incloſing all the Muſcles of the *Tibia* and *Tarſus*, for which Reaſon it is alſo ſtiled the *Faſcia Lata*. It hath an acute carneous Origination, from the anterior Part of the Spine of the *Os Ilium*, twixt the Origine of the *Sartorius* and tendinous Origination of the *Glutæus* and being expanded into a carneous which fills the Interſtice made by the of the two laſt deſcribed Muſcles, and ſuperior Part of the *Rectus*, and the an Part of the *Glutæus medius*, grows tendi in its oblique Deſcent four Inches bre below the great *Trochanter*, whence it its Courſe directly over the *Vaſtus Ext* to the ſuperior Appendage of the *Fib* where it has its proper Inſertion. But in Progreſs thither, it is join'd with the dinous Expanſion of the *Glutæus* which ariſing from the Spine of the does cover the exterior Part of the *Gl Medius*, and all the external Muſcles of *Tibia* as well as thoſe of the *Os Femoris*, taking its Deſcent over the *Patella*, inc the Muſcles of the *Tarſus*, and is conj with the annular Ligament, which re the Tendons of the Feet and Toes; un we would ſuppoſe that the ſaid *Faſcia* does terminate at the inferior Part of *Os Femoris*, or the upper Parts of the and *Fibula*, and that the laſt named ſhould give an Origination to the in Part of the ſaid *Faſcia*, a Thing which may raiſe a Diſpute, ſo it is of no great ment or Uſe.

In the Action of this Muſcle, th and Thigh are drawn outwards; its don being conjoin'd with Part of the *Gl major*, and having a different Order of bres making an Interſection with each do by this Intertexture form a ſtrong ſucre, incloſing as well the *Common* of the Leg, as covering the *Proper* which means they ſtrengthen them in Offices, as the tendinous Expanſion of *Biceps Cubiti* does thoſe of the Wri Fingers.

The *Serratus major*, has received its from the Uſe Taylors make of it, in p one Leg and Thigh over the other, they are working croſs-leg'd; it is called the *Longiſſimus Femoris*, becau exceeds all the other Muſcles of that P Length; and *Faſcialis*, from its co that Part of the Thigh and Leg, in th ture of another Bandage. Its Riſe is

fleshy from the anterior Part of the
e of the *Os Ilium* close by the precedent
cle, and in its Descent obliquely in-
ls above the *Adductor Rectus* and *Vastus*
nus, and over Part of the *Triceps*, being
n equal breadth and thickness, meets
the *Gracilis* below the Muscle of the
h internally, and descending with it,
s tendinous in its Passage over the in-
r and inferior Head of the *Os Femoris*,
ler a very straight Inclosure of the be-
described *Fascia Lata*,) and has its Inser-
four Inches breadth below the upper
of the *Tibia* laterally.

he *Gracilis* has received its Name from
ompass, being the most slender of these
cles. For tho' its Rise is somewhat broad,
y tendinous partly carneous, from the
ubis internally between the first and
nd Heads of the *Triceps* as described be-
yet in its straight Descent on the in-
of the Thigh it becomes narrow, and
s tendinous a little above the precedent
cle, and is so implanted (immediately
ath it) to the *Tibia*.

he Use of this Muscle, is in Conjun-
with the precedent and the next fol-
ng, to bend the Thigh and Leg in-
s.

he *Semitendinosus seu Semimembranosus*, has
ined its Name from its being half ner-
and half tendinous. Its Rise is partly
nous and partly fleshy, from the inte-
Part of the Protuberancy of the *Os*
n, and immediately expanding it self
a large carneous Belly, turns into a
d Tendon in half its Progress, which
nding over the carneous Belly of the
following Muscle, does pass also by
Gastrocnemius on the back Part of the
ior Appendage of the *Tibia*, from
ce it stretches forwards to its Implan-
n in the said Bone immediately below
nsertion of the precedent Muscle.

the Action of this Muscle, in Con-
ion with the next preceding, the *Tibia*
ded directly backwards; its Tendon,
her with the two precedent and fol-
g Muscles, form the inward Ham-
s, as they are commonly stiled.

e *Semimembranosus* having obtained its
mination from its being half tendinous
alf membranous, has its Situation un-
der the next preceding Muscle. Its Origine is broad and tendinous from the Protuberancy of the *Os Ischium*, and as it descends grows broader, and in less than one half of its Progress (where the Belly of the precedent Muscles becomes fleshy) begins to grow carneous, and expands it self into a large and carneous Belly, lying under the long round Tendon of the former, and becoming a short thick Tendon, has its Implantation to the superior Part of the superior Appendage of the *Tibia* backwards. And here it is to be observed, that the carneous Belly of the next precedent Muscle is seated above, and that of this below, but this Tendon on the contrary.

The *Biceps Femoris*, to distinguish it from the *Biceps* of the *Cubit*, has obtained its Name from its being double Headed. The upper and longest of these Heads has its Origination with a round Tendon from the same Protuberancy of the *Os Ischium*, with the two precedent; as it descends, it grows large and fleshy, and at above half its Progress becomes less again, where it is conjoin'd with its other Head, which has a broad partly tendinous partly fleshy Origine, from the *Linea Aspera* of the *Os Femoris*, immediately below the Termination of the *Glutæus major*.

After it is thus united, it grows tendinous as it takes its Course in a Channel or Furrow on the exterior Appendage of the *Os Femoris*, and becomes entirely tendinous at its Insertion into the superior Appendage of the *Fibula*.

Besides, the Use generally attributed to this Muscle, *viz.* in Conjunction with the two precedent to bend the *Tibia*, its Office is also to turn the Leg, together with the Foot and Toes outwards, when we sit with our Legs bended.

The *Popliteus*, or *Subpoplitæus* as it is called by some, has its Rise with a short strong Tendon, from the exterior Head of the inferior Appendage of the Thigh-Bone, from whence in its Descent obliquely over the Articulation it grows fleshy, and being dilated is so implanted to the upper Part of the *Tibia* internally, immediately below its superior Appendage.

The Use of this Muscle, is not only to be Assistant to the three preceding Muscles

in bending the *Tibia*, but alſo antagonizeth the next preceding, by turning the Foot and Toes outwards when we ſit with the Knees bended.

The *Rectus Femoris*, ſo called from its ſtraight Situation and Progreſs, has its Riſe fleſhy from a Protuberancy of the *Os Ilium*, that is in the Midway between the anterior Part of its Spine and the *Acetabulum*, from whence it deſcends directly between the two next following Muſcles and over the *Cruræus*. Its Fibres run downwards externally from a middle Line obliquely laterally; internally they ſtretch according to its Length, and grow abſolutely tendinous four Fingers breadth above the Knee-pan, where it is conjoin'd with the Tendons of the three following Muſcles, and has its Inſertion together with them at the ſuperior Part of the *Tibia*.

The *Vaſtus Externus* has been named from its Magnitude and Situation. Its Riſe is outwardly tendinous, and inwardly carneous, from the exterior Part of the great *Trochanter* and *Linea Aſpera* of the *Os Femoris*, from whence its Fibres run down obliquely forwards, and on the contrary grow outwardly fleſhy and inwardly tendinous, and ſo ſoon as they meet with the Tendon of the next preceding Muſcle, become entirely tendinous, joining with it and thoſe of the two following.

The *Vaſtus Internus* has its Name like the next preceding from its Magnitude and Situation; its Origination is large, partly fleſhy, partly tendinous, it being continued from the *Linea Aſpera*, the poſterior Part of the *Os Femoris*, from immediately below the leſſer *Trochanter*, till within three Fingers breadth above the inferior Appendage of the ſaid Bone internally laterally; From hence its carneous Fibres deſcending obliquely outwards in an almoſt ſemicircular Courſe, on a ſudden (like the former Muſcles) ceaſe to be fleſhy, and its Tendon being join'd with that of the *Rectus*, together with the former and following Muſcles, has its Inſertion with them.

The *Cruræus ſive Femoræus*, has obtained its Name from its Situation on the *Os Femoris*, like the *Muſculus Brachiæus* on that of the Arm; it has a large and carneous Origination, being continued from betwixt the greater and leſſer *Trochanter* of the *Os Femoris* forwards, to its inferior Part immediately above its lower Appendage. Its fleſhy Fibres in their direct Deſcent become entirely tendinous a little below the ſuperior Part of the Tendon of the *Rectus*, where it unites with it and the Tendons of the two laſt treated of Muſcles, which in its Paſſage over the outward Part of the Knee-pan (or on each Side of it), and is implanted to a Prominency at the upper and fore Part of the *Tibia*.

Theſe four laſt deſcribed Muſcles, viz. the *Rectus*, the *Vaſtus Externus*, *Vaſtus Internus*, and the *Cruræus*, may not improperly be conſidered as one Muſcle only, becauſe they ſeem to make but one Tendon at their Implantation, and perform the ſame Office, *viz.* to extend the *Tibia* or Leg. Nevertheleſs, they have different Bodies, one of them being incloſed on all Sides by the Fascia *Lata*, namely, the *Rectus*, and within themſelves have a multiform Order of fleſhy Fibres, by which they are enabled to perform their Function with the more Strength. A Thing abſolutely neceſſary, not only in violent Exerciſes, as in Running, Walking, Leaping, *&c.* but alſo in ſtanding to keep the Body upright, by oppoſing that Flexion at the Knee, which would elſe unavoidably happen, thro' the Preſſure of the ſuperincumbent Weight.

'Tis upon this Account alſo, that the extending Muſcles are formed larger in ſo great a Proportion than their Antagoniſts the Flexors or Benders, as apparent from their Weight, for theſe extending Muſcles being weigh'd (at *Chirurgeons-Hall*), with their Antagoniſts alſo the Flexors in the ſame Body, it was found that the former exceeded the latter two Pounds wanting one Ounce in Weight; for the *Extenſores* weighed three Pound ſix Ounces, whereas their Antagoniſts the *Flexores* weighed no more than one Pound ſeven Ounces.

Should it be enquired (ſince it is ſo manifeſtly neceſſary in moſt, if not in all the Motions of the whole Body, that the Leg ſhould be extended with great Force, it being bended to ſupport its own Weight) why the Muſcles employed in that Office ſhould all have their Terminations in one Tendon, when at the ſame Time their Antago-

gonists the *Flexores* have different Implan-
tions on both Sides the Bones of the Leg;
which they enjoy a greater Advantage in
forming their Actions, than that one
gle Inſertion of the *Extenſores*.

Unto this it is anſwered, that this Stru-
ure is not only proper for the Beauty of
Part, but it is abſolutely requiſite alſo,
t the Tendons of the *Extenſores* ſhould
conjoin'd into one near their Implanta-
ns, and that a bony Body, ſuch as the
ee-pan is, ſhould be placed upon the
ticulation of the *Os Femoris* with the Leg,
defend it from ſuffering a Compreſſion
en we are going down ſteep Places,
ich could not have been done, had they
n ſeparately inſerted on each Side of
Bones of the Leg, like the *Flexores*.

CHAP. XXXIV.

of the Muſcles of the Foot or Tarſus.

Olumbus, *Fallopius*, and ſome other Ana-
tomiſts, number eight Muſcles belong-
to each Foot, and deny *Veſalius* his
nth, it being Part of the *Extenſor Digito-
Longus*, which has its Inſertion into
Bone of the *Metatarſus* of the little Toe.
t *Spigelius*, *Veſlingius*, and the more mo-
n Anatomiſts, reduce the two firſt of
Ancients, *viz.* the *Gaſterocnemius Exter-*
and the *Gaſterocnemius Internus* into one,
o which they give the Name of *Gaſte-
nemius Externus*, and give the Name of
erocnemius Internus to its ſubjacent Muſ-
called *Solius* by the former Anatomiſts,
thus reckon no more than ſeven Muſ-
belonging to each Foot, in which
mputation, we intend to follow their
tſteeps.

The *Gaſterocnemius Externus*, becauſe (in
njunction with the *Solæus* or *Gaſterocne-
Internus*) it forms the Calf of the Leg;
s called alſo *Gemellus*, from its being as
ere double: For it has two diſtinct
neous Origines, from the ſuperior and
erior Parts of each Protuberancy of the
ior *Appendix* of the *Os Humeri*, which
eir Deſcent are each expanded into two
e fleſhy Bellies; the interior of which is
the thickeſt and largeſt, having each a dif-
ferent *Series* of fleſhy Fibres, and are con-
join'd with each other near where they
form a broad ſtrong Tendon, which beco-
ming narrower, joins with the great Ten-
don of the *Gaſterocnemius Internus* four Fin-
gers breadth above its Implantation to the
Os Calcis.

Riolan and *Veſalius* do affirm, that in the
Originations of theſe Muſcles there are
two *Oſſa Seſamoidea*, which we muſt ac-
knowledge with *Marchette* to have hitherto
eſcaped our diſcovery; However, 'tis not
improbable, that ſuch a thing may be ob-
ſerved in Subjects of a very advanced Age,
as it appeared in a Body lately diſſected on
one Side only.

In the Action of this Muſcle, the Foot is
extended or pulled backwards, a Motion
which is very neceſſary in Walking, Run-
ning, Leaping and ſtanding on Tip-toe:
For which Reaſon it is alſo, that thoſe that
walk much have theſe Muſcles larger than
others by the frequent Uſe of them, as may
be apparently obſerved in moſt Porters and
Chairmen, as alſo in thoſe who wear low-
heeled Shoes.

The *Plantaris* has received its Name from
its Tendon, being expanded in the *Planta Pedis*
like that of the *Palmaris* in the Palm of the
Hand.

Its Riſe is fleſhy from the ſuperior and po-
ſterior Part of the external Protuberancy of
the inferior *Appendix* of the *Os Femoris*, im-
mediately under the external Origination of
the next preceding Muſcle, and deſcending
obliquely between it and the next follow-
ing, ſoon grows a thin flat Tendon, which
ſtretching out from beyond their carneous
Bellies, deſcends internally laterally by their
great Tendon, and taking its Paſſage over
the *Os Calcis*, expands it ſelf on the Side of
the Foot, where it adheres cloſely to the fleſhy
Body of the *Muſculus Flexor Digitorum Per-
foratus*, and has its Implantation on both
Sides of the firſt Internode of each little
Toe.

The Uſe of this Muſcle is ſomewhat ob-
ſcure; its tendinous Expanſion on the Bot-
tom of the Foot being chiefly ſerviceable in
defending the ſubjacent Muſcles, Tendons,
Nerves and large ſanguineous Veſſels, from
ſuffering a Compreſſion in Standing, Walk-

ing, and other ſuch-like Exerciſes. It is obſervable, that the fleſhy Origination and the long Tendon of this Muſcle is ſometimes wanting.

The *Gaſterocnemius Internus*, has its Situation under the two precedent Muſcles; it is called alſo the *Solæus* from its Figure, which is not unlike unto that of a Sole-Fiſh; its exterior carneous Part being covered with a tranſparent tendinous Expanſion, which makes it appear of a livid Colour: Its Origination is partly tendinous, but for the greateſt Part fleſhy, from the poſterior Part of the ſuperior Appendage of the *Fibula*, and the poſterior Part of the *Tibia*, that is, below the Implantation of the *Subpoplitæus*, and increaſing into a large Belly conſiſting of various *Series* of carneous Fibres (ſome of them underneath, expreſſing the Figure of the Top of a Feather) whoſe *Stamina* here being tendinous, are united with the great Tendon, which is about four Fingers breadth in length, and implanted to the ſuperior and poſterior Part of the *Os Calcis*.

The Foot, together with the Toes, being inſtead of Leavers to the whole Body, 'twas neceſſary they ſhould be provided with Muſcles of great Strength to make their Extenſion; for which Reaſon it is, that we find theſe Muſcles ſo far to exceed the *Tibiæus Anticus* their Antagoniſt, not only in the advantageous Texture of their various *Series* of carneous Fibres, but alſo in their Magnitude and Implantation at the Extremity of the *Os Calcis*; by which means they are not only made ſerviceable to us in walking, running, leaping and ſuch like Exerciſes, but enabled alſo to ſupport the *Tibia* in ſtanding, leſt the Preſſure of the ſuperincumbent Weight of the Body ſhould make them incline forwards at their Articulation with the *Tibia*.

The *Tibiæus Anticus* has received its Name from its Poſition at the anterior Part of the *Tibia*. *Spigelius* calls it the *Muſculus Cateræ*, becauſe when it is divided, the Patient is obliged to make uſe of a Sling to ſupport the Foot in walking; its Riſe is fleſhy from the inferior Part of the ſuperior *Appendix* of the *Tibia*, between its Prominency, where the great Tendon of all the *Extenſores* of the Leg has its Inſertion; and the *Muſculus Extenſor Magnus Digitorum Pedis* its Origination. Its fleſhy diſgregate Origine continues thus for near two Thi of the ſuperior Part of the ſaid *Tibia* ex nally lateral next to the *Fibula*, wh forming a fleſhy Belly, is leſſened in its Progreſs, and becoming a ſtrong ſomewhat round Tendon, ſtretching liquely downwards over the lower P of the *Tibia*, and under the *Ligamen Annulare*, has its Inſertion to the Inſide the *Os Cuneiforme Majus*, that ſuſtains *Os Metatarſi* of the great Toe.

The Uſe of this Muſcle, is to pull Foot upwards and forwards directly.

The *Peroneus Primus*, called alſo the *Longus*, becauſe it is the firſt that appears in View, and alſo the longeſt Muſcle placed on the *Os Perone* or the *Fibula*. Its Riſe externally tendinous, and internally carneous from above half the ſuperior Part of the ſaid Bone, and ſtretching ſomewhat backwards, turns into a ſtrong flat Tendon four Fingers breadth in length, above the inferior *Appendix* of the ſaid *Perone* called the *Malleolus Externus*, paſſing behind which in a Channel (like a Rope in a Pulley) and from thence being inflected forwards together with the Tendon of the next following Muſcle, they continue their Courſe under an unbanding Ligament, as they run over the *Os Calcis*; but this Tendon declining from its Companion, extends over the *Os Cuboides* under the *Muſculus Abductor* of the little Toe, and over the *Oſſa Cuneiformia* in the Bottom of the Foot, and under the Tendons and *Muſculi Flexores* of the Toes, and has its Implantation to the ſuperior and poſterior Part of the *Os Metatarſi* of the great Toe.

The Tendon of this Muſcle being conveyed over the poſterior Part of the *Malleolus Externus* as on a Pully, the Ball of the great Toe (as that Part is commonly called where it is inſerted) is thus, by a moſt artificial Contrivance of Nature, directed toward a perpendicular bearing of the Weight of the Body on the Leg when we ſtand on Tip-toe, by pulling the Foot and Toe ſomewhat outwards.

The *Peroneus Secundus*, called by ſome *Semifibulæus*, has a ſharp carneous Origination, above the Middle of the exterior Part of the *Perone*, under the fleſhy Belly of the preced-

ecedent Muſcle; it likewiſe continues its ſhy Origination from the poſterior ſharp dge of the ſaid *Perone*, and growing a ſhy Belly, becomes tendinous as it runs nder the outward Ankle, together with e Tendon of the precedent Muſcle, and s its Inſertion to the upper and out- ard Part of the *Os Metatarſi* of the little oe.

The proper Uſe of this Muſcle, is to pull e Foot and Toes outwards.

The *Tibialis Poſticus* having its Situation the poſterior Part of the *Tibia*, is ſtiled ſo the *Muſculus Nauticus*, becauſe it is ry ſerviceable to Seamen when they climb the Maſts of their Ships. Its Poſition ing partly under the *Muſculus Flexor ter- Internodii Pollicis*; this Muſcle muſt be rtly raiſed, as well as the *Flexor tertii In- rnodii Digitorum Pedis*, before you can have full View of it; but after this, it will ap- ar double Bellied, having its Riſe partly ndinous partly carneous, from the ſupe- or and poſterior Part of the *Perone*, as kewiſe from the Ligament that is conti- ued between the ſaid Bone and the *Tibia*; near half its Progreſs it becomes leſs, and owing fleſhy again, makes a ſtrong and und Tendon, which runs within a *Sinus* the poſterior Part of the inferior *Appen- x* of the *Tibia*, called the inner Ankle un- r an annular Ligament, and has its In- rtion into the *Os Naviculare* internally and terally.

The Uſe of this Muſcle is to draw the oot upwards and inwards.

CHAP. XXXV.

Of the Muſcles of the great Toe.

THE Motion of the great Toe is per- formed by its proper Muſcles. Moſt natomiſts reckon only four of theſe, but e have in ſeveral Diſſections obſerved ſix ſtinct Muſcles belonging to the great Toe, z. the *Extenſor Pollicis Longus* and *Exten- Brevis*, the *Flexor Pollicis Longus* and *evis*, the *Abductor* and *Adductor Pollicis*, hich are moſt exactly delineated in *Bidloe*. nto this may be added, the *Muſculus ranſverſalis Placentini*, which ſome Au- thors make to be an *Abductor Pollicis*; but as I rather take it for an *Abductor Minimi Digiti Pedis*, we will refer its Deſcription to the following XXXVI*th* Chapter.

The *Extenſor Pollicis Longus* has not its Riſe, as moſt Anatomiſts will have it, from the *Tibia*, or from the Ligament between it and the *Perone*; but from the anterior Part of the *Perone* with a large and fleſhy Origination, from immediately below its upper Appendage to four Fingers breadth above the lower one, and deſcending under the annulary Ligament of the *Tarſus* between the Tendon of the *Tibiæus Anticus* and the Tendons of the *Extenſor Pedis Longus*, and taking its Courſe along the upper Part of the Foot, is implanted to the ſuperior Part of the ſecond Bone of the great Toe.

Its Uſe, according to its Name, is to extend the great Toe.

The *Extenſor Pollicis Brevis* has not been mentioned by Anatomiſts, who have miſtaken it for Part of the *Extenſor Brevis Digitorum Pedis*, but we have conſtantly obſerved in Diſſection, and found it frequently diſtinct.

Its Riſe is fleſhy from the anterior Part of the *Os Calcis*, and being expanded into a Belly, ſoon becomes a long ſlender Tendon, which taking its Paſſage obliquely over the ſuperior Part of the Foot, has its Inſertion into the upper Part of the ſecond Bone of the great Toe; its Uſe is to extend or pull the great Toe upwards.

The *Flexor Pollicis Longus*, is a direct Antagoniſt to the *Extenſor Longus*, having its Riſe oppoſite to it, from the poſterior Part of the *Perone*, with a double *Series* of carneous Fibres running to a middle Tendon (like the *Flexor tertii Internodii Pollicis Manus* above deſcribed) but ceaſes to be fleſhy in its Paſſage over the Juncture, and running thro' a Channel, and the inner Part of the *Os Calcis*, under the Tendon of the *Muſculus Flexor Digitorum Pedis Longus Perforans*, over the next following Muſcle, is implanted to the upper End of the ſecond Bone of the great Toe.

The *Flexor Pollicis brevis*, is a ſhort, thick and fleſhy Muſcle, ſeemingly divided into two Muſcles, by the Tendon of the next preceding, which paſſes over it. Its

Riſe is from the ſuperior Part of the *Os Cuneiforme Medium*, and taking its Courſe over the Implantation of the *Muſculus Peroneus*, is inſerted into the *Oſſa Seſamoidea* of the great Toe, who are likewiſe tied to the upper Part of the ſecond Bone of the ſaid Toe, which it bends.

The *Adductor Pollicis* has its Origination fleſhy from the *Os Calcis* internally laterally, but in half its Progreſs becoming tendinous, it joins with another fleſhy Origine, ariſing from the *Os Cuneiforme Majus* that ſuſtains the *Os Metatarſi* of the great Toe. Both theſe uniting in one Tendon, are implanted to the external Part of the *Oſſa Seſamoidea* of the great Toe laterally.

The Uſe of this Muſcle, is to draw the great Toe from the other Toes.

The *Adductor Pollicis* is deſcribed and delineated by *Veſlingius*, and mentioned by *Marchette*; its Riſe is partly tendinous and partly fleſhy, from the lower Parts of the *Os Cuneiforme tertium*, and expanding it ſelf into a fleſhy Belly, it takes its Paſſage obliquely in the Bottom of the Foot, and becomes leſs and tendinous at its Implantation to the internal Part of the *Oſſa Seſamoidea* of the great Toe laterally oppoſite to the Inſertion of the former.

The Uſe of this Muſcle, is to draw the great Toe nearer unto the other Toes.

CHAP. XXXVI.

Of the Muſcles of the Four leſſer Toes.

THeſe (like the Muſcles of the Fingers) are diſtinguiſh'd into *Common* and *Proper*.

The *Common* Muſcles of the Toes, are called thoſe that have their Tendons implanted into all the leſſer Toes, as the *Extenſor Digitorum Pedis Longus*, *Extenſor Brevis*, the *Perforatus* and *Perforans*.

The reſt are the *Proper* Muſcles of the Toes, *viz.* the *Lumbricales*, *Abductor Minimi Digiti Pedis*, *Tranſverſalis Placentini*, and the *Muſculi Interoſſei*.

The *Extenſor Digitorum Pedis Longus*, hath its Origination ſharp and fleſhy, from the lower Part of the ſuperior Appendage of the *Tibia* next the *Perone* or *Fibula*, as alſo a fleſhy one, from the upper Part of the laſt named Bone, and being leſſened in half its Deſcent on the Leg, it conjoins with a ſecond broad diſgregated fleſhy Origine, continued for near half the lower Part of the ſaid *Perone*, where deſcending under the annulary Ligament of the *Talus*, 'tis divided into five Tendons, four of which have their Inſertions to the third Bones of all the leſſer Toes, and the Fifth to the upper Part of the *Os Metatarſi* of the little Toe, this being that Part which by *Veſalius* is made the ninth Muſcle appertaining to the Foot.

The *Extenſor Digitorum Pedis Brevis*, is a ſhort carneous Muſcle, ſituated under the Tendon of the next preceding on the Foot. Its Riſe is fleſhy, from the exterior and anterior Part of the *Os Calcis*, and ſoon expanding it ſelf into a fleſhy Belly, this is divided into four carneous Portions, which become ſo many Tendons, which taking their Paſſage over the ſuperior Part of the Foot, make acute Angles with the Tendons of the next preceding Muſcle, as they run over the firſt Internode of each leſſer Toe to their Implantations at the ſuperior Part of their Second.

The *Perforatus* has obtained its Denomination, becauſe its Tendons are perforated like thoſe of the Fingers. It is ſtiled alſo the *Flexor ſecundi Internodii Digitorum Pedis* from its Uſe or Office, and the *Sublimis* from its Poſition. It ariſeth from the lower and inner Part of the *Os Calcis*, between the *Muſculi Adductores* of the greater and leſſer Toes. It is expanded into a fleſhy Belly, after it hath taken its Courſe over the Middle of the *Planta Pedis*, and is divided into four carneous Portions, which become ſo many Tendons, and are ſeparated near their Implantations, in order to give Paſſage to the Tendons of the next following Muſcle thro' them, to their Inſertions; theſe being reunited, do paſs underneath them to their Terminations at the ſuperior Part of the ſecond Bone of each of the leſſer Toes.

Its Uſe is mentioned before, and declared by its Name of *Flexor ſecundi Internodii*, &c.

The *Perforans* has received its Name from its Tendons running thro' the Separations or Fiſſures of the Tendons of the next pre-

ceding,

ing Muſcle. It has alſo been named the *cor tertii Internodii Digitorum Pedis* from Uſe, like the former.

ts Riſe is ſharp and fleſhy from the po-ior Part of the *Tibia*, immediately under *Muſculus Subpoplitæus*, and it has a dou- *Series* of Fibres united in a middle Ten-, like the *Flexor Longus Pollicis*, but it s ceaſe to be fleſhy in its Paſſage behind *Malleolus Internus* or inner Ankle, and ning in a Channel over the interior Part he *Os Calcis* under its imbanding Liga-ts in half its Progreſs through the *Plan-edis*, it is divided into four Tendons, ch take their Courſe thro' the Fiſſures or forations of the next preceding Muſcle, have their Implantations to the third e of every one of the leſſer Toes.

ts Uſe is mentioned before, and declared e in the precedent) by its Name of *cor Tertii Internodii Digitorum Pedis.*

he *Muſculi Lumbricales* have obtained r Denomination from their Figure, like e of the Hand of the ſame Name: The atomiſts do moſt commonly deſcribe n ariſing from the Tendons of the laſt cribed Muſcle; yet we rather are apt to eve, that their true Origination is at the *nea Maſſa* in the *Planta Pedis*, its Riſe g from the internal Part of the *Os Cal-* and growing tendinous, it unites with Tendons of the next precedent Muſcle, he Middle of the *Planta Pedis*, and then ding it ſelf into four (as it were) ſeparate y Muſcles, they all grow tendinous at r Implantations to the internal Parts of leſſer Toe laterally next the great Toe. he *Abductor Minimi Digiti Pedis*, has its outwardly carneous, but inwardly inous, from the exterior Part of the *Os is.* It grows tendinous in half its Pro-s on the exterior Side of the Foot, and s with the other fleſhy Part of this Muſ- ariſing fleſhy from the exterior Part of *Os Metatarſi* of the little Toe, and ma- one Tendon at its Implantation to the ſuperior Part of the firſt Bone of the little Toe externally laterally.

The *Tranſverſalis Pedis*, has been ſo named from its tranſverſe Poſition. Its Riſe is tendinous from the internal *Os Seſamoides* of the great Toe, and growing into a fleſhy Belly in its Progreſs over the firſt Internodes of the two next Toes, it leſſens it ſelf at its Implantation to the lower Part of the *Os Metatarſi*, which ſupports that Toe that is next to the leſſer.

Its Uſe or Office, is to draw the leſſer Toe to the greater.

Unto this may not improperly be added a *Flexor Oſſis primi Minimi Digiti Pedis*; for tho' ſome number it among the next following *Interoſſei*, its Situation ſufficiently convinces us, that it does not appertain to them. Its Origination is fleſhy, from the upper of the *Os Metatarſi* of the little Toe, and it takes its Courſe directly to its Implantation in the firſt Bone of the leſſer Toe.

It is in the Tendon of this Muſcle and the *Muſculi Interoſſei*, that the *Oſſa Seſamoidea* of the leſſer Toes have their Poſition.

The *Muſculi Interoſſei Pedis* have taken their Names from their Situation in general, but may each of them challenge a particular Appellation from their Uſe or Office; there being computed ſeven of them, the *Firſt* may very properly be called an *Adductor Minimi Digiti Pedis*. The *Second* being the largeſt, and drawing the next Toe towards the leſſer, may be ſtiled *Abductor Auricularius*. The *Third* antagonizing the next precedent, is the *Adductor* of that Toe. The *Fourth* may be ſtiled the *Abductor Medii Digiti Pedis*; and the *Fifth*, an *Adductor* of the ſame Toe. The *Sixth* is an *Adductor*; and the *Seventh* may be named an *Abductor Indicis Pedis.*

All theſe ſeveral Muſcles have their Originations fleſhy from the upper Part of the *Oſſa Metatarſi* of the leſſer Toes, and turning into bellied Bodies, become tendinous at their Implantations to the firſt Internode of each Toe laterally.

A Deſcription of a Muſcle in General, its Compoſitio and Motion. Taken from the ſame, and divers oth Modern Authors.

A Muſcle is the chief and immediate Inſtrument of voluntary Motion, under which Denomination is called all that Part of the Body which is called Fleſh, and is not made up of one continued Maſs, but diſtinguiſh'd into ſeveral Portions contiguous to one another, in ſo decent and admirable an Order, as is beſt conducing, not only to a moſt elegant *Symmetry* of the whole Body, but exactly adapted alſo to the Execution of the Action or Office of each particular Muſcle.

A Muſcle is compoſed of *Membranes*, *Tendons*, *Arteries*, *Veins*, and *Nerves*; unto which ſome have added the *Lympheducts* and *Fat*. Among theſe, the two firſt are accounted the *Proper Parts* of the Muſcle, and the reſt *Common*.

According to the intimate Structure of a Muſcle, as it appears in an adult Subject, it is diſtinguiſhed into the *Head*, *Belly*, and *Tail*.

The *Head* or Beginning is as it were the Center of its Motion, fix'd to the moſt ſtable Part. Its Middle, or moſt tumid Part, is ſtiled the *Belly*; and its other Extream, which is implanted in the Part moved, is named its *Tail* or Termination.

After the Skin and adipoſe Membranes are removed, the *Common Integument* of Muſcles is that which offers it ſelf immediately to our Eyes. This is frequently joined by a Complication with the Tendons of the Muſcles, eſpecially where moſt firm Incloſures are required, as on the Muſcles of the Cubit, and thoſe of the Thigh and *Tibia*.

The *Proper Membrane* of a Muſcle is that which immediately incloſes it, and is often conjoined with the former, eſpecially on thoſe laſt mentioned Parts, where their Complication is made by tendinous Expanſions, in ſuch a Manner that it becomes inſeparable from it. This *Membrane* not only invol each Muſcle, but diſtinctly incloſes *Faſciculus* of its fleſhy Fibres; as is appare in the *Glutæi majores*, *Deltoides*, *&c.* A theſe *Faſciculi* of fleſhy Fibres are in a pe liar Manner aſſiſted by thoſe their proper cloſures, as the Muſcles of the *Cubit* are the *Faſcia Lata*, whoſe Office is explained its proper Place.

In the Interſtices of theſe *Faſciculi*, in robuſt Bodies, we frequently meet with which, with the Help of an ordinary Micro cope, is diſcovered to be compoſed of cert tranſparent membranous Cells, diſtende with an unctuous Subſtance, which Dr. *Jon* plainly diſcovered by the naked Eye the Diſſection of a *Porpus*.

Theſe adipoſe Cells are provided wi Blood Veſſels, as was ſufficiently demo ſtrated in an Experiment lately made the Injection of *Mercury* into the Artery the Arm. The Uſe of this oily Matter, cording to Dr. *Havers*, in his *Oſteologia* is to be joined with the mucilaginous Mat ſeparated from the adjacent Glandules, order to make a Compoſition to preſerve tendinous and fleſhy Fibres from being ſiccated, and become rigid, by lubrica and conſequently rendring them fit Action.

The *Tendon* of each Muſcle is either *united* or partly *divided*, or elſe totally *rated*: If *united*, it is intirely tendinous divided, it is accounted fleſhy; and fore is ſaid to conſiſt of tendinous and Fibres, or fleſhy Fibres only.

The Parts of them that are entirely te nous, are a *Compages* of Filaments comp united, without the leaſt apparent Int ſition of other Parts, as ſanguineous Ve

rves, *&c.* The fleshy Fibres are contiguous th the former, and provided with sanneous Vessels, Nerves, and Lympheducts. These are divided into divers *Fasciculi* of a *ismatical* Form, *Hexagon*, *Square*, or *Trianar*. Each *Fasciculus* is composed of di- tendinous Filaments, which are placed rallel to each other, tho' by the Disruption these Prismes divers oblique *Interfibrillæ* y appear, which, doubtless, made *Steno* agine them to be of a *Rhomboidal* Conture. But these, by the Help of the *Mi- scope*, do also appear to be only Parts of the ided *Fasciculus*; that Appearance of them ng occasioned partly by their Agglutina- to each other, and partly also by the tribution of the sanguineous Vessels and rves passing thro' each *Fibrilla*, and these ersecting each other, might impose on *Bo- us*, and make him imagine, that these *Fi- læ* did consist of many *Fibrillæ* of a *Rhom- dal* or Lozenge-like Figure.

Each of these *Fibrillæ* are much smaller n the finest Hair, their Figure is cylindri- and their interior Substance porous like Hair, with this Difference nevertheless, t the Pores of that are more numerous less, but in this the Pores are larger and so numerous.

The Nerves do accompany the sanguineous ssels in their Ingress into the Muscles, and dispersed to all their fleshy Fibres. For- ly some were of Opinion that the *Head* the Muscle was the Place of their Inser- s; but that Opinion has been rejected e, it being apparent, that divers Mus- receive two or three Branches of Nerves different Parts of them.

How the Extremities of Nerves terminate those as well as in other Parts, is a Secret Nature, and likely to continue so for , since the same are not to be discovered er by the naked Eye or any Microscope et known.

The Examination of Nerves by the Help he Microscope has however sufficiently vinced us, that nothing that has been said hem is less probable than that one of Functions is to carry any Part of the itious Juice to other Parts, as some have neously imagined. They tell us indeed, an *Atrophia* of the Part will follow e there has been an Abscission or remarkable Relaxation of its Nerves; but if it be considered what a great Alteration must be introduced into the Tone of the Parts whose Nerves are separated or relaxed, we need not be much at a Loss to find out another Cause for that *Phænomenon*.

We are convinced by ocular Demonstration, that the Trunks of Nerves consist of divers *Fasciculi* of *Fibrillæ*, placed parallel to each other; but by the Help of Microscopes it is a Matter of Autopsie also, that those *Fibrillæ*, which before were scarce discernible, will discover themselves to be composed of divers other *Fibrillæ*, and all of them full of Pores. And if by Chance you discover a single *Fibrilla*, (as sometimes it will happen) you may also discover its Substance to be porous, tho' (if we may be allowed to make a Calculation by the Microscope) it does not seem to exceed the hundredth Part of a Hair.

Now it is easily to be conceived, that the Matter contained in these fine curious Cells or Pores must of Necessity be very subtile; but whether it may come under the Denomination of animal Spirits, or an acreous Body, such as the *Materia primi* or *secundi Elementi*, as it is called by *Descartes*, I will not pretend to determine here.

Neither is it at present within the Compass of our Scope to enter upon an Enquiry concerning the Transmission of this subtile Matter from the grand Fountains, whether of the Brain or sanguiferous Vessels, passing immediately between the nervous *Fasciculi*, this Point having been treated of by Dr. *Ridley* and others.

The Blood Vessels of each Muscle (like those of other Parts) are the Arteries and Veins, the first of which import the Blood into it, as the latter export and reconvey it to the Heart.

How these transmit their Contents to each other, has been no small Controversy among Anatomists, till Mr. *Lewenhoek*, by the Help of his Microscope, discovered these Vessels in the transparent *Fimbriæ* of an Eel, or *Lacerta Aquatica*, to be continued Channels, without the Interposition of any spongeous Body, which indeed had been long before conjectured by some Anatomists, and may now be demonstrated by the *Microscopes* of the best Improvement.

And

And upon this Occaſion, I can't forbear to give you an Account of an Experiment I lately made, by an Injection of *Mercury* into the great Artery of the Arm, which not only evinced what *Borellus* had obſerved, that ever the carneous Fibres of Muſcles are in themſelves white, (their red Tincture proceeding from the Blood;) but ſerved for an Intimation alſo of a peculiar Conformity of the Extremities of the ſanguineous Veſſels, they being filled as full with Mercury as they could be before with Blood; and when afterwards I took a narrow Inſpection into the *Fibrillæ*, I obſerved their before-mentioned Cells or Pores alſo filled with the *Mercury*.

However, theſe Cells, as far as I have been able to diſcover as yet, do not communicate with each other, but, as I have ſome Reaſon to conceive, there are certain *Foramina* in the Sides of the Arteries that open into them.

Each Globule of Mercury in the *Fibrillæ* did appear to be very near as big as two or three Globules of the Blood; from whence it may be accounted how the Intumeſcency of theſe Parts happens, by the frequent Injection of Water by the Arteries in dead Animals. That being a Body whoſe Parts are very apt to inſinuate themſelves in every minute Part, theſe Cells become diſtended by it, and hence alſo an Account may be given how Muſcles are excited to Action by ſuch Injections made ſoon after the Death of the Animal.

The former Anatomiſts being not fully acquainted with the intimate Structure of a Muſcle, and the true Uſe of thoſe Parts that compoſe it, did place the Power of Contraction in its Nerves, or in its fleſhy Fibres only.

The moſt induſtrious *Steno*, conceiving the carneous Fibres and oppoſite Tendons of Muſcles to bear a near Reſemblance in their Structure to *Parallelograms*, is of Opinion, That an Alteration of the Angles of their *Areæ* may be made by Extenſion only of its fleſhy Fibres, which, as he ſuppoſes, may be effected without the Influence or Acceſſion of any new Matter.

Dr. *Willis* imagines, That the animal Spirits brought thither by the Nerves are lodged in the Tendons of the Muſcles, which being intermix'd with other Particles of an active Nature, ſupplied from the Blood, produce Effervеſcency, by which the fleſhy Fibres ing exagitated, and being lax and po are filled up, and become corrugated; whence he conjectures the Contraction the whole Muſcle to ariſe.

Dr. *Mayow* attributes the Contraction a Muſcle to an Efferyency ariſing from Intermixture of certain *ſulphureous ſaline* ticles ſeparated from the Maſs of Blood, of the *nitroaereous* Ones tranſmitted by Nerves.

Monſieur *du Verney* pretends, That an tumeſcency may be made in the fleſhy Fib of Muſcles without any Ferment, ſuppoſ that the Tendons are the Reſervatories Spirits, which being exagitated by new O from the Brain, thoſe, together with a J ſupplied from the Arteries, produce an tenſion in the fleſhy Fibres like a Fidd String expoſed in a moiſt Air.

Dr. *Croon* ſuppoſes each diſtinct fleſhy F bre to conſiſt of an infinite Number ſmall Globules opening into one anoth and that the nutritious Juice convey'd large among the fleſhy Fibres through t Arteries by the conſtant Pulſe of the He is thruſt on, and being afterwards mi with another Liquor between thoſe Fibr paſſes into the Cavity of each Globule Bladder, whereby being intermix'd with ſecond Sort of Matter more active than t former, by theſe conſtant Agitations, Ebu lition and Effervеſcency, with the natur Heat; this, as he imagines, is the Cau and partly the conſtant Aſſiſtant of the M tion of the Muſcle, as may be ſeen Mr. *Hook*'s *Philoſophical Collections*, N *P.* 22.

Borellus conceives the intimate Conſtr cture of a Muſcle to be a Compoſition Chain of divers *Rhombi* or Lozenge-like B dies, whoſe *Areæ* may be either enlarged leſſened by the Acceſſion or Retroceſſion Bodies, inſinuating it ſelf like Wedges it. Theſe he ſuppoſes to be a nervous J inſtilled at the *Imperium Animæ*, join with the Blood or Lympha, which produ an Ebullition or Fermentation.

The Experiments I have made, compa with that before-mentioned of the Injec of *Mercury*, ſeem to intimate, that the B barely conſidered as a Fluid is an Aſſi

the Contraction of a Muſcle. This did ot only appear by making a Ligature on e deſcending Trunk of the *Aorta* of a li- ng Animal, whereby all the lower Parts come void of Motion, which they reco- ered again ſo ſoon as the Ligature was oſened, and the Blood had its Paſſage pened again into the Muſcles: But even ter the Motion was ceaſed in the ſame Ani- al, it was almoſt ſupriſing to ſee theſe uſcles of the Legs to renew their Contra- ions upon the Injections of Water only nto the Crural Artery. And this Experi- ent I have frequently repeated with the me Succeſs.

From theſe Experiments I begun to conjecture, That the Blood is the Weight by which the Action of a Muſcle is performed; and that either by a Turgeſcency began in the *Parietes* of the Cells of the carneous Fibres, cauſed by the Contents of the Nerves agitated at *Imperium Animæ*, or by Conſtriction of the venous Duct, may be the immediate Cauſe of Repletion of the Cells, whereby the Length of their *Fibrillæ* is leſſened; which Opinion ſeems to agree very near with that of *Borellus*, as likewiſe with Dr. *Croon*, the laſt of which may be ſeen in Mr. *Hook*'s *Philoſophical Tranſactions*, N°. 2.

An Explication of ſome Figures relating to the Myology or Doctrine of the Bones.

Fig. III. *Demonſtrates the anterior Part of the Humane* Penis *prepared with* Mercury.

A, A. The Skin, together with the reſt of he common Integuments of the *Penis*, cleared rom it.

a, a. That Part of them which compoſeth he Fore-Skin.

B. The Beginnings of the *Corpora Caverno-* ſeparated from the Bones of the *Pubes*.

b, b. The Veins.

c, c. The Nerves.

d, d. The Arteries, as they appear on the *Dorſum Penis*.

C. The *Glans* or *Balanes* of the *Penis*.

D, D. The *Muſculi Erectores Penis*.

E, E. The *Tranſverſalis*.

F. Part of ihe *Sphincter Ani*.

f. A Blow-Pipe inſerted into the Urinary aſſage.

G, G. The Trunks of the two Arteries of the *Penis* cut from the internal Branches of the *Iliac* Arteries.

g, g. Their Two inferior Branches which run to the *Muſculi Erectores*.

h, h. Their ſuperior Branches, which adminiſter Blood to the adjacent Parts.

i, i. Thoſe Arteries which paſs to the Bulb of the cavernous Body of the *Urethra* or Urinary Paſſage.

k, k. Their large Trunks ſubdivided again, the external of which, d, d, paſs on the ſuperior Surface of the *Penis*, the internal, *L*, *L*. enter the *Corpora cavernoſa*.

H, H. The Nerves of the *Penis*.

I. The *Vena ipſius Penis*.

K, K. The Vein of the *Præputium* or Fore Skin, which are joined with the former.

L, L. The *Lymphæducts*.

Fig. IV. *Repreſents the two* Corpora Cavernoſa Penis, *and that of the Urinary Paſſage, after a tranſverſe Section, when inflated and dried.*

A, A. The *Corpora Cavernoſa* of the *Penis*.

B. The *Corpus Cavernoſum* of the *Urethra*.

C. The Trunk of the *Vena ipſius Penis*.

D, D. The Trunks of the two Arteries, which take their Paſſage thro' the *Corpora Cavernoſa* of the *Penis*.

Fig. V. *Shews the* Dorſum *or back Part of the Humane* Penis.

A. The *Glans* or *Balanus* of the *Penis.*
a. The *Frænum* or Bridle.
B. The exterior Surface of the *Corpus Cavernoſum* of the Urinary Paſſage.
C, C. Its Bulb covered with the *Muſculus Accelerator.*
b. The Conjunction of its right Side with the left, correſponding to the Seam of the Skin in the *Perinæum:*
e, e. Its two Extremities incloſing the cavernons Body of the *Urethra*, which terminates on the Sides of the *Corpora Cavernoſa* of the *Penis* it ſelf.
D. Part of the *Sphincter Ani.*
E, E. The *Muſculi tranſverſales Penis.*
F, F. The *Erectores*, or *Directores of Penis.*
G, G, G, G. The cavernous Bodies of *Penis.*
H, H. The Arteries.
d, d, d. Thoſe Branches which Blood to the Muſcles.
e, e. Two large Trunks of them ſubdivided into two more, f. g.
I, I. The Nerves of the *Penis.*

Fig. VI. *Repreſents the internal Parts of the Extremities of the two* Corpora Cavernoſa, *and that of the* Glans *of the* Penis.

A. The *Dorſum* or back Part of the *Penis* covered with its *Scapula.*
B. The external Part of the *Glans.*
a. Part of the *Septum* of the cavernous Bodies.
b, b. The internal Membrane of the carneous Bodies of the *Penis* covered by *Glans.*
C. The Cavernous Body of the *Glans* the *Penis*, or the Extremities of the Cavernous Bodies of the *Penis.*

Fig. VII. *Demonſtrates the Bulb of the* Corpus Cavernoſum *of the* Urethra *being dried after Inflation.*

A. The external Part of the Bulb, diveſted of the *Muſculus Accelerator Urinæ.*
B. Part of the Bulb raiſed after Section to repreſent its interior cavernous Conſtructure.
a. The *Septum* of the Bulb.
C, C. The *Muſculi Tranſverſales.*

Fig. VIII. *Repreſents Part of one of the* Corpora Cavernoſa *of the* Penis *being likewiſe dried after Inflation.*

A. That Part of the *Capſula* of the *Corpus Cavernoſum* next the *Os Pubis*, which is here compreſſed by the Ligature made to retain the Wind.
B. The *Muſculus Erector Penis.*
C, C. The Artery, and its being diſtributed within the *Corpus Cavernoſum Penis* on either Side.

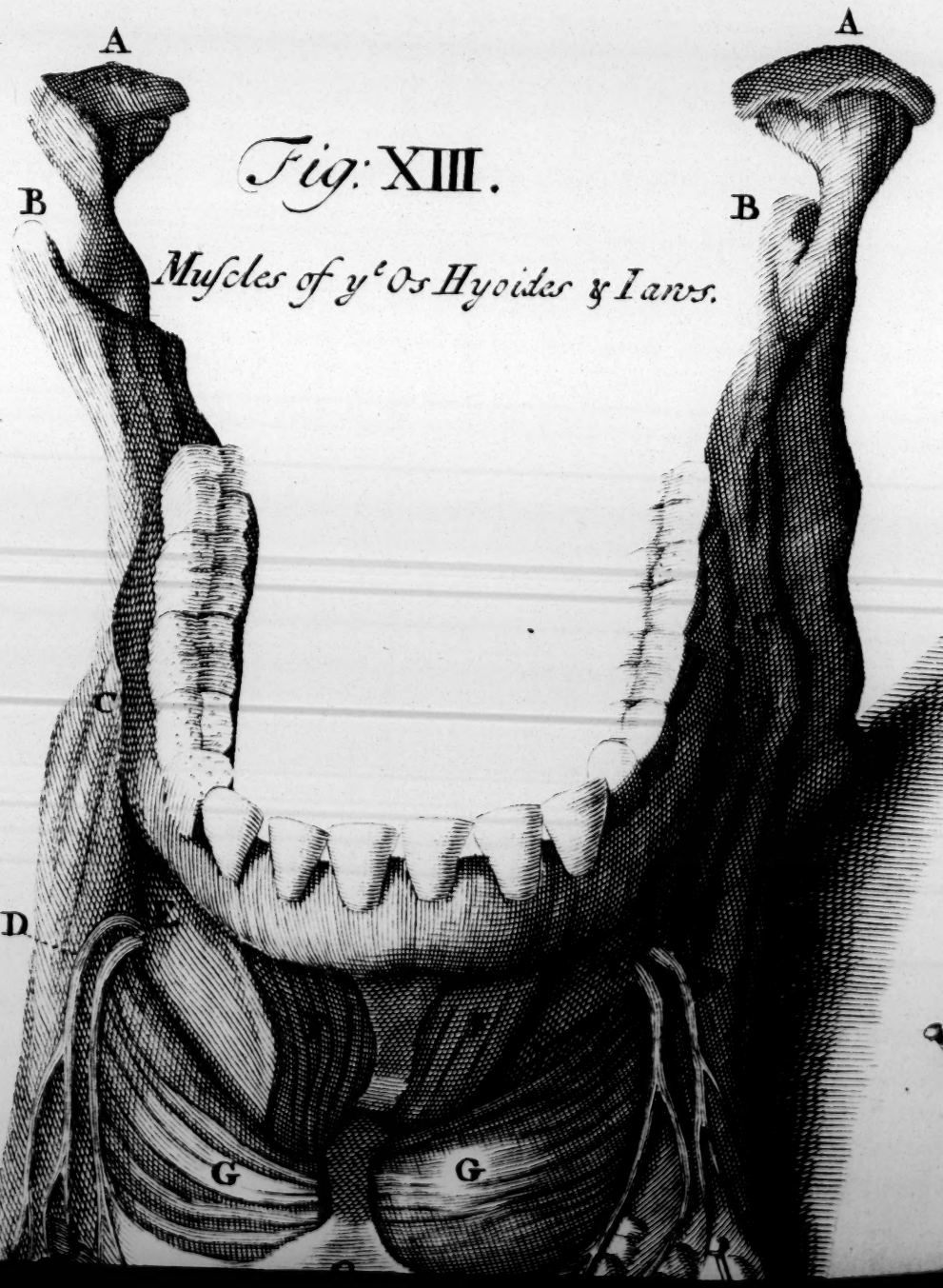
Fig. IX. *Exhibits the Bulb of a Dog's* Penis *after Inflation.*

A. The external Surface of the Bulb.
B. A Ligature made on a Vein that ariſes from the ſuperior Part of it, into which enter the Veins of the Fore-Skin, and therefore may be called the *Venæ Præputii.*
C, C. The large Trunk of one of the Veins of the *Penis* it ſelf, which in this Animal is double, ariſing from each Side of the Bulb.

Fig: X.

Muſcles of y^e Fore- -part of y^e Head.

Fig: XIII.



Muſcles of y^e Os Hyoides & Ianvs.

Fig: X

-Muſc

Vol 2 p. 139.

Fig: XII.

Muſcles of the Eye

Fig: XI.

Muſcles of the Ear &c.

Fig: XVII.

Muſcles of y^e hind-

part of y^e Head & Neck

Muſcles of y^e Gargareon.

Fig: XVIII.

Muſcles of y^e Larinx.

Fig: XV.

Fig: XIV.

Muſcles of y^e Tongue.

Fig: XVI.

Muſcles of y^e Fore- -part of y^e Head.

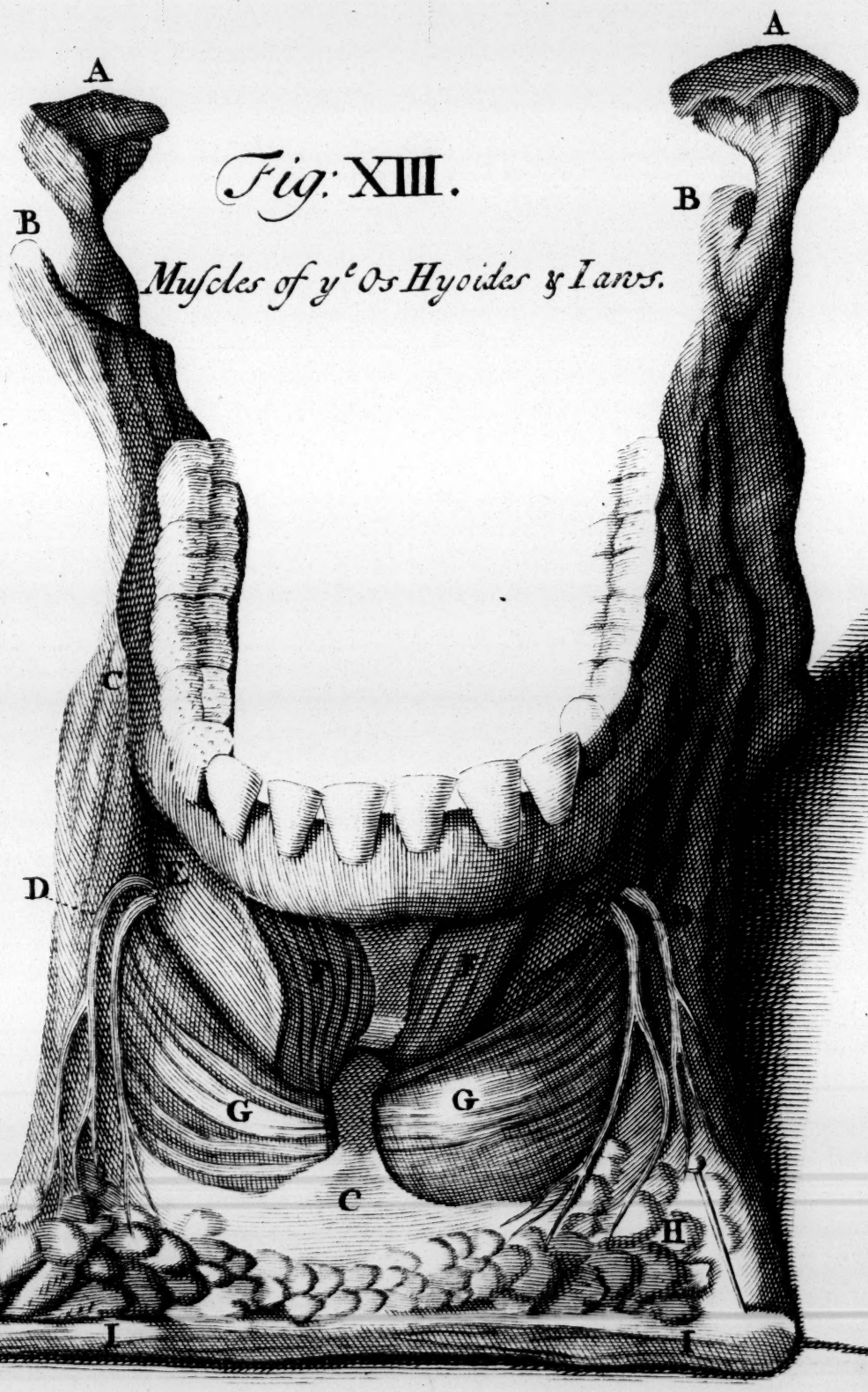


Fig: XIII.

Muſcles of y^e Os Hyoides & Iaws.

Fig:

Muſc

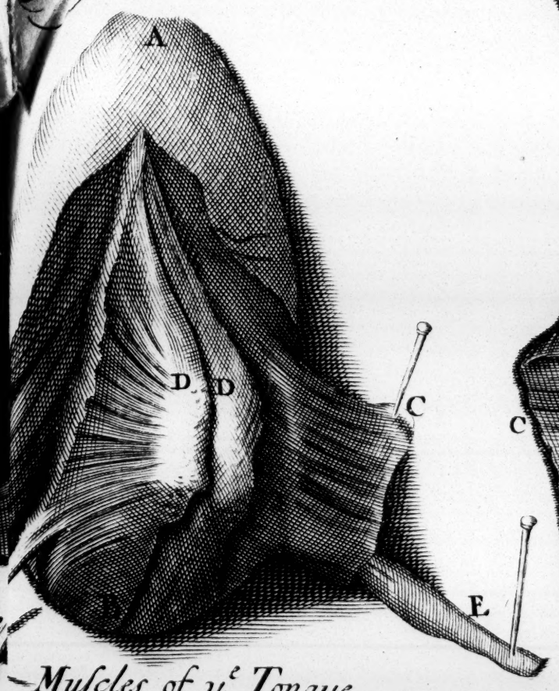
Muſcles of y^e Gargareon.

Fig: XVIII.

Muſcles of y^e Larinx.

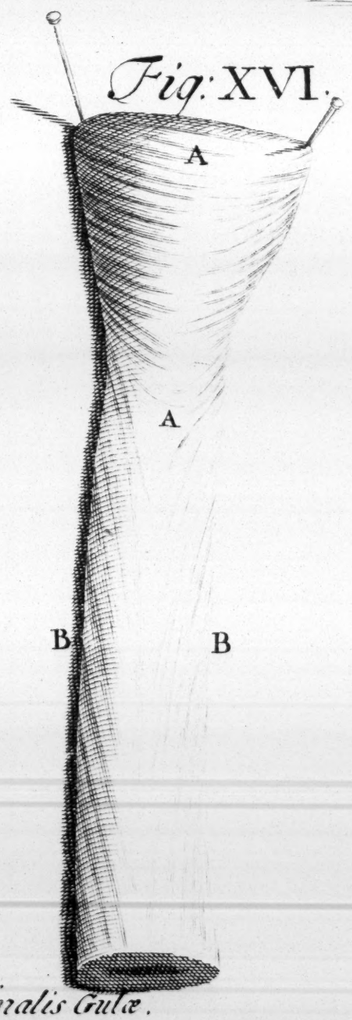
Fig: XV.

Fig: XIV.



Muſcles of y^e Tongue.

Fig: XVI.



Vaginalis Gulæ.

Several figures of the Muſcles done from the lateſt & beſt Authorities.

The internal Appearance of the cavernous Body of the Bulb.

E. The Cavity of the Veins, which communicates with the *Cavernulæ* of the Bulb.

F, F. The Cavernous Body of the *Penis*.

Fig. X. *does repreſent the Muſcles of the Face, the* Quadratus Genæ *being removed.*

A. The *Muſculi Frontales.*
B. The *Orbiculares Palpebrarum.*
C. The *Muſculus Retractor Alæ Naſi*, conjoined with the *Elevator Labii ſuperioris proprius*, E, E.
D. *The Elevator Labiorum Communis.*
E. The *Elevator Labii ſuperioris proprius.*
F. The *Sphincter Labiorum.*
G, G. The *Muſculi Zygomatici.*
H. The *Depreſſor Labiorum.*
I. The *Depreſſor Labii inferioris proprius.*
K. The *Buccinator*, partly *inſitus.*
L. The *Temporalis.*
M. The *Attollens Auriculam.*
N. The *Maſſeter.*
O. Part of the *Digaſtricus inſitus.*
P. Part of the *Maſtoideus.*
Q. A Portion of the *Cucullaris.*
R. Part of the *Elevator Scapulæ inſitus.*
S, S. Part of the *Muſculi Sternohyoidei.*
T. T. Part of the *Muſculi Coracohyoidei.*
a. Part of the *Os Jugale.*
b, b. The Cartilage of the *Auricula.*
c, c. The *Glandula Paratis.*
d, d. Its *Ductus Excretorius* paſſing over the *Muſculus Maſſeter.*
e, e. A Branch of the *Carotide Artery.*
f. Part of the lower Jaw-Bone bared.
g. The *Glandula Maxillæ inferioris.*

Fig. XI. *Repreſents the whole Eye, together with the Origination, Progreſs, and Inſertion of its Muſcles when taken out of the* Orbita.

A, A. The *Tunica Selerotis*, compoſing the exterior Surface of the poſterior Part of the Bulb of the Eye.
a, a. The Optick Nerve.
B. A Portion of the upper Part of the Bone of the *Orbita* next the Noſe, to which the little Cartilage called the *Trochlæa*, b, is fix'd.
C. A Portion of the lower and oppoſite Part of the exterior Edge of the Bone of the *Orbita*, from whence the oblique inferior Muſcle has its Riſe.
c. The Originations of the Four right and ſuperior oblique Muſcles of the Eye from the profoundeſt Part of the *Orbita.*
D. The *Muſculus obliquus ſuperior*, whoſe Tendon runs through the *Trochlæa*, b, to its Inſertion at the poſterior Part of the Bulb of the Eye, A, behind the Implantation of the following Muſcle.
E. The *Muſculus attollens.*
F. The *Muſculus abducens.*
G. The *Muſculus deprimens.*
H. The *Muſculus abducens.*
I. The *Muſculus obliquus inferior.*

Fig. XII. *Shews the* Baſis *of the Skull, with the Muſcles that ariſe from the firſt* Vertebræ *of the Neck, and are implanted to it; together with ſome of thoſe imployed in the Motions of the upper and under Lip.*

A. Half the inferior Jaw-bone on the left
B. The *Muſculus Pterigoidæus internus inſitus.*
C. Part of the *Os Sphænoides.*
c, c. The *Alæ Pali.*

D. The *Muſculus Depreſſor Labii ſuperioris proprius, ſeu Conſtrictor Alæ Naſi inſitu.*

d. Part of the *Elevator Labii inferioris proprius*, remaining at its Origine.

c. The inferior Part of the Brink of the *Orbita*, from whence the inferior oblique Muſcle has its Riſe.

E. The *Os Jugale.*

F. The *Proceſſus Pterigoides* or *Aliformis.*

f, f. The *Proceſſus Styloides*, one of which is frequently broken by the Rope after the common Execution of Criminals, as it happened on this Subject on the right Side.

G, G. The *Proceſſus Maſtoides*, or *Mammiformes.*

H. The poſterior Part of the firſt *Vertebra* of the Neck.

g, g. Its two Proceſſes that are articulated with the Second *Vertebra.*

h. The Extremity of the tranſverſe Proceſſes of the ſaid firſt *Vertebra.*

i. The *Muſculus annuens*, or *Rectus minor anticus*, diſcovered firſt in the Year 1685.

K. The *Muſculus abruens Lateralis*, or *Rectus Lateralis*, mentioned by *Fallopius.*

l. The *Obliquus ſuperior Capitis.*

m The *Rectus minor poſticus.*

I. The right Auricle or outward Ear.

n, n. Its Lobe cut off.

K. K The *Os Occipitis.*

L. The *Os Squammoſum* or *Temporale.*

M. The *Os Frontis.*

O. That Part of the *Orbita* unto which the *Trochlæa* does adhere.

Fig. XIII. *Does repreſent the lower Jaw-Bone, with the proper Muſcles of the under Lip remaining to it.*

A, A. The *Proceſſus Condyloides.*

B, B. The two other Proceſſes of the under Jaw, called *Corone.*

C, C, C. Part of the internal Membrane that inveſts the Mouth.

D, D, E, E. The Nerves and the ſanguineous Veſſels paſſing out of the two Perforations in the lower Jaw-Bone to the Glandules and Muſcles of the Lips and Cheeks.

F, F. The *Muſculi Elevatores Labii inferioris proprii*, not hitherto deſcribed by any Author.

G, G. The internal Surface of the *Muſculus Depreſſor Labii inferioris proprius.*

H, H. The Glandules of the Cheeks.

I, I. Part of the *Muſculus Sphincter Labiorum.*

Fig. XIV. *Repreſents the inferior Side of the Tongue, with its Muſcles.*

A. The *Apex* or Tip of the Tongue.

B. Its Baſis or Root cleared from the *Os Hyoides.*

C, C. The *Muſculi Ceratogloſſi.*

D, D. The *Muſculi Geniogloſſi.*

E, E. The *Muſculi Styloglossi.*

a. A Branch of the guſtatory Nerve.

Fig. XV. *Shews the poſterior Part of the Muſcles of the* Fauces.

A, A. The *Muſculi Stylopharingæi.*

B, B. The *Muſculi Pterigopharingæi.*

a, a. The *Glandulæ Tonſillæ.*

C, C. The *Muſculus Oeſophagæus.*

b, b. The upper Part of the *Oeſophagæus* raiſed to diſcover the Progreſs of the *Stylopharingæus* underneath it.

c. A Piece of the long Proceſs of the *Thyroidal* Cartilages, which is joined to the *Hyoides.*

D. The ſuperior Part of the *Oeſophagæus*, *Muſculus Vaginalis Gulæ.*

g. XVI. *Demonſtrates the* Oeſophagus, *or Part of the* Muſculus Vaginalis Gulæ.

A, A. The internal or tranſverſe Fibres, ng continued from the *Muſculus Oeſopha-*

B, B. The external or longitudinal Fibres of the *Vaginalis Gulæ.*

Fig. XVII. *Shews divers Muſcles of the Head and Neck.*

A. The Hairy Scalp.
B. The *Os Occipitis.*
C. Part of the *Muſculus Splenius.*
D, D, D. The *Complexus* raiſed from its rtion.
E, E. The *Recti majores* on the Right Side, on the Left depending.
F, F. The *Muſculi obliqui ſuperiores.*
G, G. The *Obliqui inferiores.*
H, H. The *Muſeli Recti minores.*
I. The *Os Jugale.*
K. The *Proceſſus Maſtoides.*
c. The back Part of the firſt *Vertebra* of the Neck.
d. Part of the *Muſculus Complexus* remaining *inſitu*, which by *Fallopius* is made a diſtinct Muſcle, and with its Fellow is by him reckoned the Third Pair of the Head.
I, I, I. The *Muſculi Spinales Colli.*
K. The *Muſculi Tranverſales Colli.*
L, L, L. The *Interſpinales Colli.*
e, e, e, e. The *Apices* of the double Spines of the *Vertebræ* of the Neck.
f. The Extremity of the Spine of the firſt *Vertebra* of the *Thorax.*

Fig. XVIII. *Shews Part of the Organ of Hearing of a Calf.*

A, A. Part of the *Os Petroſum* divided.
B. The *Foramen rotundum.*
C. The *Stapes* in its proper Situation on *Foramen Ovale.*
D. The *Muſculus Stapidis.*
F. A ſmall Bone in the Tendon of the laſt named Muſcle, as it paſſes over a Projection of the *Os Petroſum*, which compoſeth the *Foramen rotundum*, B.
G. Part of the *Cochlea* broken.

The HEADS *of the ſeveral* Chapters.

Chap. I. *Of the Muſcles of the Lower Belly.*
Chap. II. *Of the Muſcles of the Teſticles.*
Chap. III. *Of the Muſcles of the Manly d.*
Chap. IV. *Of the Muſcles of the Urinary dder.*
Chap. V. *Of the Muſcles of the* Anus.
Chap. VI. *Of the Muſcles of the Hairy Scalp and Forehead.*
Chap. VII. *Of the Muſcles of the Eyelids.*
Chap. VIII. *Of the Muſcles of the Eye.*
Chap. IX. *Of the Muſcles of the Noſe.*
Chap. X. *Of the Muſcles of the Cheeks and Lips.*

Chap. XI.

Chap. XI. *Of the Muſcles of the* Auricula, *or the external Ear.*
Chap. XII. *Of the Muſcles of the internal Ear.*
Chap. XIII. *Of the Muſcles of the* Os Hyoides, *or of the Bone of the Tongue.*
Chap. XIV. *Of the Muſcles of the Tongue.*
Chap. XV. *Of the Muſcles of the* Larynx.
Chap. XVI. *Of the Muſcles of the* Fauces.
Chap. XVII. *Of the Muſcles of the* Gargareon.
Chap. XVIII. *Of the Muſcles of the inferior* Maxilla.
Chap. XIX. *Of the Muſcles of the* Thorax *that appear in View, the Body lying ſupine.*
Chap. XX. *Of the Muſcles belonging to the* Scapula *or Shoulder-Blade.*
Chap. XXI. *Of the Muſcles of the* Thorax *which appear in View, the Body lying prone.*
Chap. XXII. *Of the Muſcles of the Head.*
Chap. XXIII. *Of the Muſcles of the Neck.*
Chap. XXIV. *Of the Muſcles of the Back and Loins.*
Chap. XXV. *Of the Muſcles of the Arm.*
Chap. XXVI. *Of the Muſcles of the Cubit.*
Chap. XXVII. *Of the Muſcles of the Palm of the Hand.*
Chap. XXVIII. *Of the Muſcles of the Fingers.*
Chap. XXIX. *Of the Muſcles of the Thumb.*
Chap. XXX. *Of the Muſcles of the Wriſt.*
Chap. XXXI. *Of the Muſcles of the Radius.*
Chap. XXXII. *Of the Muſcles of the Thigh.*
Chap. XXXIII. *Of the Muſcles of the Leg.*
Chap. XXXIV. *Of the Muſcles of the Foot.*
Chap. XXXV. *Of the Muſcles of the great Toe.*
Chap. XXXVI. *Of the Muſcles of the leſſer Toes.*

An APPENDIX, *containing a Deſcription of the* PENIS, *and the Manner of its Erection.*

Raynard de Graaf has given us a very exact Deſcription of this Part in his Treatiſe of the Organs of Generation; and *Frederick Ruiſh*, in his Anatomical Chirurgical Obſervations, has repreſented the Structure of its Glans more accurately than what was obſerved before; unto which we will add what, upon a ſtrict Enquiry into this Subject, we have had Occaſion to diſcover.

The *Penis* or Manly Yard is an Organ framed for the Ejection of the Seed, and Emiſſion of Urine, conſiſting of certain ſpongeous or cavernous Bodies, with their Veſſels and Integuments.

To begin with the Integuments, or its external common containing Parts: Theſe are the *Cuticula*, *Cutis*, and *Membrana Carnoſa*.

The *Epidermis* or *Cuticula* of this Part does not differ from that of other Parts, excepting on the *Glans*, where, by the Help of a *Microſcope*, its external Surface appears downy.

The *Cutis* or Skin, A, A. in this as well as in the *Scrotum*, is much thinner than in moſt other Parts of the Body; and both have a peculiar Diſpoſition of their Blood-Veſſels, K. K. The Arteries are called *Pudenda* here, which having their Riſe from the external Branch of the *Iliac*, and running under the upper Part of the Skin, are diſperſed into many Branches, the larger of which are ſtill ſubdivided, till they dwindle into capillary Veſſels. From the Extremities of theſe are continued ſo many Veins, which uniting again into larger Branches, take their Paſſage into thoſe that partly have their Origines from the cavernous Bodies of the *Penis*, and ſtretching along under the common Teguments, do diſcharge themſelves into the upper Part of that continued from the *Vena Saphena* of the Foot; which for Diſtinction's Sake we call the *Venæ Præputii*.

Beſides the ſanguineous Veſſels, it is provided alſo with Lymphæducts, L, L. which

e firſt diſcovered by the Injection of pre-
ared *Mercury* into this Part; which is
greeable to the Opinion of *Shelhamer* and
uch concerning the Origine of theſe Ducts.
But whether they have their Riſe here from
hat Part of the *ſanguineous* Canal called the
rtery, or the Vein, I could not diſcover
by my Experiment, ſince I made Injection
to both promiſcuouſly. But I found ſeve-
al Trunks on each Side accompanying the
ena of the Prepuce, under the common Te-
uments, which, as I ſuppoſe, diſcharge them-
lves, like thoſe ariſing from the inferior
arts, into the *ingeinal* Glandules.

This Conſideration ſhews us how the mor-
ific Matter is convey'd more particularly
to thoſe *Glandulæ* in the *Venereal Tumors* cal-
ed commonly Pocky *Buboes*, which is con-
firmed by thoſe *Phænomena* that are previous
to them, as Ulcers or Inflammations on the
Prepuce, check'd by the too early Uſe of
external Adſtringents, which cauſing an In-
ſpiſſation, if not a total Coagulation, in the
reſluent *Lympha*, conſequently diſenable it
thro' thoſe *Veſiculæ Glanduloſæ* into their ex-
porting *Lymphæducts*, which of Neceſſity muſt
cauſe a Tumor. Hence alſo we may be in-
formed how ſoon the Malignity may be con-
veyed into the Maſs of Blood by the Paſſages
of the *Lympha*, and a good Reaſon be offer'd
for the opening of a venereal Bubo before the
uſual Time of Suppuration.

Dr. *Tyſon* has diſcovered certain ſmall
Glands in that Part where the *Glans* of the
Penis is contiguous to the Prepuce, unto
which he has given the Name of odoriſe-
rous Glandules, from the great Scent their
ſeparated Liquor does ſend forth; but their
Number is not always the ſame, for thoſe
that have the Fore-Skin longer than ordinary,
they have them both more and larger, and ſe-
parate a greater Quantity of its Liquor,
which being lodged there, grows often acri-
monious, and corrodes the *Glans* of the Manly
Yard.

In moſt Quadrupeds, but more eſpecially
in Dogs and Boars, they are very conſpicu-
ous; and in the latter of theſe Animals
their ſeparated Liquor is contained in a pecu-
liar *Cyſt* at the Verge of the Prepuce, out of
which there is a large Aperture, whereby it is
emitted again to lubricate the *Penis* of that
Animal.

The Third common Integument of the Manly Yard is the *Membrana Carnoſa*, becauſe this Part has ſeldom any Fat, for divers Reaſons: For firſt, thereby that neceſſary Stiffneſs in Erection of this Member ſhould be hindered; Secondly, it would be apt to grow too bulky; and Thirdly, it would have damp'd the Pleaſure the Male is ſo ſenſible of in the venereal Act. But whether it was upon thoſe Conſiderations that Nature has framed this Part without a *Membrana adipoſa* does not appear, ſince its Want of Fat may probably depend on its great Alteration from that Laccidity when it is not erected, to that Extenſion of it when it is. In the former, tho' there cannot be any great Obſtacle why its adipous Cells ſhould not be ſupplied with their Oil, except its too great Laxity ſhould retard the influent Blood in its Paſſage through the *Capillary Arteries*; yet, in the latter, its great Extenſion may not unlikely cauſe a Compreſſion in them to diſcharge their contained Oil, which may be the Reaſon why the Interſtices of the Muſcles and other Parts moſt quieſcent are ſubject to be filled with Fat.

I have in the *Penis* it ſelf of Children, before Erection has been frequent, found the *Membrana adipoſa* extended with Fat; but afterwards, tho' the Membrane remains, yet the Increaſe of Fat is hindered, and therefore it is ſeldom found with any; yet in ſome adult Bodies I have obſerved it almoſt covered with Fat; but was never acquainted whether the Party ſuffered any Inconveniency by it or not.

Among the Ligaments belonging to this Part, that called the *Frænum*, or the Bridle, which ties the *Preputium* to the lower Part of the *Balanus*, challenges the firſt Place, A. This we have found ſo ſhort in ſome, that we were forced to ſeparate it to procure a compleat Erection; as it is done ſometimes alſo where a *Cicatrix* has been made after large Ulcers on it, as it frequently happens in venereal Caſes.

The next Ligament may be called the *Suſpenſorium*, which in Effect has not been taken Notice of by the Anatomiſts, yet it is not only conſpicuous, but of very conſideable Uſe alſo; of which more hereafter. Its Riſe is from the fore Part of the *Oſſa Pubis*,

bis, and is fixed to the *Dorſum Penis*, c. c. on each Side its great Vein, I.

The reſt of the Ligaments are ſuch as compoſe its *Capſulæ* or divide them, as their *Septums*; of which more alſo hereafter.

The Arteries which carry the Blood to this Part, have their Riſe from the *Rami Iliaci interni* ſometimes, and at other Times from the lower Parts of the *Arteriæ Umbilicales*; whence an Account may be given why this Part is leſs than uſual by tying the Umbilical String too cloſe to the Belly, and that not only from the Retraction of the *Urachus*, but alſo by the Conſtriction of theſe Arteries by the exceſſive Extenſion of the *Arteriæ Umbilicales* from whom they ariſe, whereby the Influence of a ſufficient Quantity of Blood may perhaps be prevented.

As theſe Arteries take their Paſſage to the Manly Yard, they emit two or three Branches on each Side; the two inferior of which take their Courſe, g. g. to the *Muſculi Directores* of the *Penis*; the two ſuperior, b, h. furniſh Blood to the adjacent Parts, and more particularly to the *Muſculi Elevatores Ani*, between which and the *Marſupiales Femorum* theſe large Trunks have their Paſſage; but ſtretching over the *Corpora Cavernoſa* of the *Penis*, they are both ſubdivided into two great Branches, the two inferior of which, i, i. paſs to the Bulb of the *Corpora Cavernoſa* of the Urinary Paſſage; but the two ſuperior, K, K. are both ſubdivided again; the external, d, d. extending on the ſuperior Surface of the *Corpora cavernoſa Penis*, the internal, l, l. entring the *Capſula*, take their Courſe through the Middle of each *Corpus Cavernoſum*, D, D. wherein being ſeparated into innumerable Branches, C, C. From theſe capillary Extremities are continued ſo many Veins, in the Canals of which are ſo many Apertures into as many Cells, D. which communicate with each other, and diſcharge themſelves into the large venous Ducts, E. paſſing on the ſuperior Surface of the *Penis*, ſome of which unite with thoſe of the Fore Skin, whilſt others do form one large Trunk, which we call the *Vena ipſius Penis*, I. taking its Courſe on the *Dorſum* of the *Penis*, immediately under that Ligament which ties the *Oſſa Pubis* together internally, (whereby it is compreſs'd in Erection) and proceeding further on the *Proſtrata*, it there becomes rigid; and enters the *Rami Iliaci* [illegible] *terni* on each Side.

The Veins, which have their Riſe in [illegible] ſame Manner from the *Corpus Cavernoſum* [illegible] *thræ*, take their Paſſage from its Bulb [illegible] the *Muſculi Acceleratores*, C, C. whereby [illegible] are compreſs'd when theſe Muſcles act.

The *Nerves*, H, H. appertaining to [illegible] *Penis*, have their Derivations from the [illegible] compoſed by the Coalition of the [illegible] the *Os Sacrum*, and a Branch remitted [illegible] the great *Crural Nerve*, which after [illegible] Conjunction provide Nerves for the [illegible] cles, *Perinæum*, and Muſcles of this Part, [illegible] cending on the *Corpora Cavernoſa* of the *Penis* and dilating themſelves on its upper Surface, C, C. are diſperſed to all its Parts.

Its *Lymphæducts* have been mentioned [illegible] the Deſcription of its external Tegument.

The *Corpora Cavernoſa Penis*, B, B. are [illegible] *de Graaf* ſtiled *Nervoſa*, and by others *Nervea Spongeoſa*. They are two *Capſulæ* [illegible] long *Folliculi*, incloſed every where on [illegible] Outſide with a thick Membrane, by *Veſ* and *Columbus* ſuppoſed to be like Ligament the exterior Surface of which is covered [illegible] Nerves and Blood Veſſels, as is repreſent d, d. e, e. They ariſe with two diſtinct [illegible] gines from the inferior Side of the *Oſſa P* whence ſtretching forwards, meet each o ſo as to leave an Interſtice before their [illegible] junction, in which the *Urethra* is conve F. Where they depart from the *Oſſa P* they are each covered with a Membrane, are afterwards conjoined with each othe the *Septum Intermedium*; which, the n it comes to the *Balanus*, becomes leſſer, an fore it ariſes to the Middle of the M Yard, its Fibres riſe upwards from the nary Paſſage to the *Dorſum* of the *Penis*, like the the Teeth of a Comb, as *de Graaf* well obſerved, but is not obliterated, the two *Corpora Cavernoſa* conjoined ne *Balanus* or *Glans*, as he would have it; on the contrary rather increaſes in T neſs, and becomes narrower, as *Ruyſ* very well obſerved.

In Inflation, the Wind may indeed ſ times paſs from theſe *Corpora Cavernoſa* [illegible] *Penis* to that of the *Urethra*, but not Times; which Communication depe the Mediation of their ſanguineous V

But the Authors don't agree concerning internal Conſtructure of theſe *Corpora ernoſa: Columbus* was the firſt who took tice of their Arteries, which running ſtreight to their Extremities, diſperſe mſelves into innumerable Branches. *Wharton* is of Opinion, that they con- partly of a glandulous Fleſh; and others gine, that they are interwoven with di- Nerves, whence they have received the me.

Diemerbroeck ſuppoſes, that they are not a r Contexture of Veſſels intermix'd in the nner of a Net, as *Bauhin*, *Riolan*, and *ſingius* would perſwade us, but that their ſtance is Fibrous, Spongeous and Ca- nous, like the Lungs, receiving into ir hollow Interſtices, Blood and Spirits m the Veſſels that are diſperſed thro' ir Subſtance.

Upon the beſt Enquiry we have been e to make, there ſeems to be a great Ana- betwixt the intimate Structure of this that of the Spleen, a Thing alſo taken tice of by *Columbus*, in both which the s of the Veins have large Apertures or ls, and are manifeſtly apparent in the b of a Dogs *Penis*, D. E. but in the Man- Yard they are here not near ſo large, at the ſame Time larger in the Spleen, have alſo their Apertures into each r; hence it is, that when the Courſe of refluent Blood is check'd or intercepted, *Penis* becomes equally diſtended, and is ed forwards towards the *Glans*, (when Muſcles are contracted.

The *Urethra* or Urinary Paſſage, has its tion upon the *Corpora Cavernoſa* of the *is*, which has alſo a peculiar cavernous dy, differing in its Figure very much that of the two others, they being at each end, and largeſt in the Middle; reas this is largeſt at both its Extremi- and leaſt in the Middle, neither is its per Integument ſo *denſe*.

The ſuperior Part of it, which is placed wixt the two Divarications of the former, lled the *Bulbus* from its Figure, being ered by the *Muſculus Accelerator Urinæ* C. (*Fig.* III.) It occupies the inferior of the *Urethra* D. (*Fig.* V.) Extend- it ſelf in the *Perinæum*, and is divided *Lithotomy*, in which caſe the Operator muſt be cautious of its Arteries which enter that Part of the *Bulb* towards the *Anus* laterally. It has alſo a *Septum Intermedium* (not obſerved by the Anatomiſts hitherto) dividing the right Side of the *Bulb* A. from the Left, which deſcending to the Extremity of the bulbous Part, is there obliterated. The Function of this *Septum* (as we ſuppoſe) is to direct the refluent Blood to the exporting Ducts, *viz.* to its two fore-mentioned Veins. This cavernous Body is in its Deſcent on the lower Part of the *Urethra* D, leſſened E. (*Fig.* V.) But as it approaches the Extremities of the two former, it is again expanded and covers them, compoſing that Part or Body which is called the *Glans* or *Balanus* A. (*Fig.* III.) and is miſtaken by *de Graef* for a carneous Subſtance diſtinct from either, but is both well deſcribed and figured by *Ruyſh* in *Centur. Obſervat.* Its *Cells* C. (*Fig.* IV.) in the *Glans* B. are much leſs than thoſe of the former, but towards its upper Part or *Bulbus* A. (*Fig.* V.) they equal them.

As to its Erection, how it is performed, the ancient Anatomiſts who were unacquainted with the Circulation of the Blood, or its Paſſage from the Arteries into the Veins, were exceedingly miſtaken in their Notions of it. *Columbus*, who has left us an almoſt perfect Deſcription of this Work, ſtill imagineth the Arteries of this Part to pour out Spirits with an uncommon Force into it, which produces its Extenſion.

Caſpar Bauhin is of Opinion, that in a Venereal Appetite, the Blood and Spirits flow into this Part in exceſs, and being inflated like a Gut with Wind, it begins to tumefy and grows hard; and this he ſuppoſes to be done by a *Muſculus Sphincter*, which in its Action produces a Conſtriction upon the Neck of the Bladder, and the Roots of its *Corpora Cavernoſa*.

For the Performance of this Function, *de Graef* aſſigns two ſorts of Veſſels, with its Muſcles, *viz.* the *Nerves*, by which the Animal Spirits are carried into its membranous Parts, and render them more inflated and rigid; and the *Arteries*, conveying the Blood in Order to diſtend the cavernous Bodies; for, ſays he, we are fully convinced, that the main Erection of the *Penis* is owing to the Blood: *Firſt*, by making In-

jections of Water into its cavernous Bodies, by its Arteries in a dead Body, we may obſerve it extended to the ſame Dimenſions as when the Animal was living: *Secondly*, in cloſely tying a Dog's *Penis in Coitu*, and afterwards examining it, we ſee nothing but Blood to cauſe this Extenſion.

Unto this may be added, that in Criminals, which hang a conſiderable time after Death, this Part becomes erected, becauſe the Blood in that Poſition of the Body falling into the lower Parts.

Thus it will likewiſe erect, by inflating the ſanguineous Veſſels in a dead Animal, which Experiment we firſt made in a humane Body, by inſerting a Blow-Pipe into the *Vena Saphænæ*, whereby an Erection was not only procured, but alſo a Proſpect of the external Diſpoſition of its ſanguineous Veſſels, and more eſpecially the Veins; which Contrivance in Nature has hitherto eſcaped the Reflection of Anatomiſts.

De Graef not reflecting duly upon the Uſe of the adjacent Parts, aſſigns its Erection to its Muſcles; for, ſays he, by the Intumeſcency of their Bellies, they not only cauſe a Compreſſion upon the cavernous Bodies, and force the contained Blood towards the *Glans*, but the Paſſages alſo thro' which it ordinarily flows back: But this latter can't take Place in the *Corpora Cavernoſa* of the *Penis* it ſelf, the *Muſculi erigentes* being at ſo great a Diſtance from their great Vein.

But according to our Obſervation compared with the Structure and Poſition of its Parts, the Manly Yard is drawn near unto the *Oſſa Pubis* when thoſe Muſcles are in Action, by means of the *Ligamentum Suſpenſorium*, whereby the Blood is not only forced forwards towards the *Balanus* in greater Quantity, and its Veins diſtended, but alſo their great Trunks ſtretching over the *Dorſum Penis* are compreſs'd, as they purſue their Courſe cloſe under the tranſverſe Ligament of the *Oſſa Pubis*.

The like can't happen in the *Corpus Cavernoſum* of the *Urethra*, becauſe there is no Bone that can produce the ſame Effect upon its Veins, as the *Oſſa Pubis* do upon thoſe of the *Penis* it ſelf; and therefore the *Muſculi Acceleratores* making a Compreſſion upon thoſe of its *Bulb* ſupply that Function. Hence it is, that in an imperfect Erection we ſee the *Balanus* not equally extended with the *Penis* it ſelf, and at other times ſooneſt grows flaccid; but when the Muſcles are in Action, the Blood contained in the *Bulb* is forced forwards towards the *Glans*, and this encreaſes its Extenſion: as we obſerve in a Piece of a Gut, filled either with Wind or Water, either End be compreſs'd, the Oppoſite being tied, it will be more diſtended.

The Blood thus ſtopp'd in its Reflux diſtends the *Corpora Cavernoſa*, which are thereby erected; the *Arteries*, which were flaccid before, having then their Trunks alſo extended, do import alſo a greater Quantity of Blood into this Part.

But as it is abſolutely neceſſary, that ſome Share of the detained Blood ſhould be reconvey'd back, leſt it become grumous and quite unfit for a Reflux, Nature has to this End contrived a Conjunction of the *Venæ Præputii* with thoſe of the *Penis* it ſelf (as has been ſhewn before) which having their Poſition under the Skin only, and running over the *Oſſa Pubis*, reconvey ſome Part of the intruded Blood to make room for a freſh Supply from the *Arteries*, and by this means to preſerve the Circulation of the Blood uninterrupted.

Of this, we ſaw once an Inſtance in an obſtinate *Priapiſme*, which would not yield to ordinary tho' reiterated *Phlebotomy*, when the Vein of the *Penis* it ſelf being opened it anſwered the deſired End, and loſt its Rigidity.

This admirable Contrivance of Nature in the Diſpoſition of theſe *exporting Sanguiferous Ducts*, *viz.* that ſome are liable to undergo a Compreſſion, whilſt others remain free, is not only obſervable in the Manly Yard and *Clitoris* of Women, but in the Penis of all Animals, as well as in the *Pudenda* of all Females, which have hitherto fallen under our Examination.

The *Obliquus Deſcendens ſeu Declivis dominis*, *Veſalius primi Muſcular.* Tab. & p. 19. *idem in Human. Corp.* Tab I. 2. ibid. *Spigel.* lib. 4. c. 10. *Veſling. Syntag. tom.* c. 2.

The *Obliquus Aſcendens ſeu Acclivis*, *gel.* Tab. 10. l. 4. L, L.

The *Pyramidalis vel Succenturiatus*, *Bidloe* 32. O.
The *Rectus*, *Bidloe* Tab. 32. M. N. P, P.
The *Tranſverſalis*, *Veſal. Muſc.* Tab. 5. 28. *Caſpar Bartholin de Structura Diaphragmatis* c. 2.
The *Muſculus Cremaſter* of the *Teſtes*, *de Graef de Virorum Organis*, Tab. 2. F. 1. D.
The *Muſculus Accelerator Urinæ*, *Cowper.*
The *Erectores ſeu Erigentes Penis*, p. 33. *Cowper.*
The *Tranſverſalis Penis*, *Cowper* Tab. XVII.
The *Erector Clitoridis*, *de Graef de Mulier. Org.* Tab. XI. II. Tab. III. F. 1. G.
The *Sphincter Vaginæ*, *idem de Mulier. Org.* ibid. and Tab. III.
The *Detruſor Urinæ*, *Spigelius* lib. 8. T. 13. M. & lib. IV. c. 12.
The *Sphincter Ani*, *Bidloe* T. 47.
The *Levatores Ani*, *Bidloe* T. 47.
The *Frontalis*, *Cowper.*
The *Orbicularis Palpebrarum*, *Cowper.*
The *Aperiens Palpebram Rectus*, *Bidloe* T. 12. A.
The *Obliquus Superior* or *Trochlearis*, *Cowper.*
The *Obliquus Inferior* or *Breviſſimus Oculi*, *Cowper* Fig. III. p. 49. *idem.*
The *Elevator Oculi*, *Cowper.*
The *Depreſſor* and *Adductor Oculi*, *Cowper.*
The *Adductor Oculi*, *Cowper.*
The *Retractores Alarum Naſi & Elevatores Labii Superioris*, *Cowper.*
The *Conſtrictores Alarum Naſi ac Depreſſores Labii Superioris*, *Cowper.*
The *Quadratus Genæ ſeu Tetragonus*, *Veſal.* M. T. 3. S.
The *Buccinator*, *Cowper* Fig. IV. p. 60. *Idem.*
The *Zygomaticus*, *Cowper.*
The *Elevator Labiorum*, *Cowper.*
The *Depreſſor Labiorum*, *Cowper.*
The *Conſtrictor Labiorum*, *Cowper.*
The *Elevator Labii Superioris*, *Cowper.*
The *Depreſſor Labii Inferioris*, *Cowper.*
The *Elevator Labii Inferioris*, *Cowper.*
The *Attollens Auriculam*, *Cowper.*
The *Retrahens Auriculam*, *Spigelius* lib. IV. T. T, T.
The *Externus Auris vel Laxator Externus* *Fabricius ab Aquapendente*, *de Aure.*
The *Obliquus Auris*, *du Verney de Organ. Auditus* T. 6.
The *Internus Auris*, *Idem* T. 6.
The *Muſculus Stapedis*, *Du Verney* T. 5. F.
The *Sternohyoidæus*, *Bidloe* Tab. 15. Fig. I. F, F. and p. 74. *Cowper.*
The *Coracohyoidæus*, *Bidloe* Tab. 15. Fig. I. G, G. and ibid. *Cowper.*
The *Stylohyoidæus*, *Bidloe* T. 15. *prope* C. ibid. *Cowper.*
The *Mylohyoidæus*, *Bidloe* T. 15. F, F. ibid. *Cowper.*
The *Geniohyoidæus*, *Bidloe* T. 15. F, F. ibid. *Cowper.*
The *Geniogloſſus*, *Cowper.*
The *Ceratogloſſus*, *Cowper.*
The *Styloglosſus*, *Cowper.*
The *Sternothyroidæus*, *Bidloe* Tab. 15.
The *Hyothyroidæus*, *Fabricius ab Aquapendente de Laryng.*
The *Cricothyroidæus*, *Idem* Fig. 26. R, R.
The *Cricoarytænoidæus Poſticus*, *Fabricius ab Aquapendente.*
The *Cricoarytænoides Lateralis*, *Idem.*
The *Thyroarytænoidæus*, *Fabricius ab Aquapendente* 24. M. 32, 33. XXX.
The *Arytenoidæus*, *Idem.*
The *Stylopharyngæus*, *Cowper.*
The *Pterigopharyngæus*, *Cowper.*
The *Oeſophagæus ſeu Sphincter Gulæ*, *Cowper.*
The *Vaginalis Gulæ.* p. 90. *Cowper.*
The *Sphæno Palatinus*, *Veſlingius* Tab. Cap. XI. *Cowper* b.
The *Pterigo Palatinus ſeu Sphæro Pterigopalatinus*, *Veſlingius* ibid. C, C. p. 92.
The *Temporalis ſeu Crotaphites*, *Cowper.*
The *Digaſtricus ſeu Biventer*, *Bidloe* Tab. 15. *Cowper.*
The *Pterigoidæus Externus*, *Cowper.*
Intercoſtales Externi & Interni, *Bidloe* Tab. 26.
The *Triangularis*, *Bidloe* Tab. 2.
The *Scalenus Primus*, *Veſalius* M. Tab. 8. C.
Scalenus Secundus, *Veſal.* M. Tab. 14. M.
The *Scalenus Tertius*, *Idem* N.
The *Subclavius*, Ibid. Tab. 5. Z. *Spigel.* T. 18. lib. 4. F.
The *Serratus Minor Anticus*, *Veſalius* M. Tab. 5. T. *Idem* Tab. 4. K.
The *Serratus Major Anticus*, Ibid. T. 2. O, O, O.

The *Diaphragma*, *Bidloe* Tab. 52. B. C. D. E. F. G. H.

The *Cucullaris & Trapezius Scapulæ*, *Veſal.* M. Tab. 9. E. K. G. H.

The *Rhomboides*, Ibid. G. H. I. K.

The *Levator Scapulæ*, Ibid. C.

The *Serratus Superior Poſticus*, *Veſalius* M. Tab. 11. F.

The *Serratus Inferior Poſticus*, *Veſalius* Tab. 11. Δ.

The *Sacrolumbaris*, Ibid. Q.

The *Splenius* of the Head, *Bidloe* Tab. 16. A, A. 118. *Cowper.*

The *Complexus*, *Bidloe* Tab. 16. F. G. H. 119. *Cowper.*

The *Rectus Major*, 120. *Cowper.*

The *Recti Minores*, *Cowper.*

The *Obliquus Superior*, 121. *Cowper.*

The *Obliquus Inferior*, 122. *Cowper.*

The *Maſtoidæus*, *Veſalius* M. Tab. 1. P *Cowper.*

The *Rectus Internus Major*, *Bidloe* Tab. 18. L, L.

The *Rectus Internus Minor*, *Cowper.*

The *Rectus Lateralis*, *Cowper.*

The *Spinalis Colli*, *Cowper.*

The *Interſpinales Colli*, *Cowper.*

The *Dorſi Longiſſimus*, *Veſalius* M. Tab. 12. N. Tab. 13. T.

The *Semiſpinalis*, *Bidloe* Tab. 28. P. Tab. 29. K, K.

The *Quadratus Lumborum*, *Veſalius* M. Tab. 13. 8. 14. P.

The *Sacer*, *Veſalius* M. Tab. 14. T.

The *Semiſpinatus*, *Idem* Tab. 13. K.

The *Pectoralis*, *Veſalius* Tab. 1. *Muſc.* L.

The *Deltoides*, *Idem Muſc.* Tab. I. K.

The *Supraſpinatus*, *Veſal.* M. Tab. 11. G.

The *Infraſpinatus*, Ibid. T, T. I.

The *Teres Minor*, *Spigelius* Tab. 17. lib. 4. a, b.

The *Teres Major*, *Veſalius* M. Tab. 11. L.

The *Latiſſimus Dorſi ſeu Aniſcaptor*, *Veſalius* M. Tab. 9. O. P.

The *Coracobrachialis*, *Veſal.* M. Tab. 1. R.

The *Subſcapularis*, *Bidloe* Tab. 65. E.

The *Biceps Cubiti*, *Veſalius* M. Tab. 1. Q.

The *Brachiæus Internus*, *Veſalius* M. Tab. 1. S.

The *Gemellus*, *Idem* M. Tab. 2. O. P. Q.

The *Brachiæus Externus*, *Idem* M. Tab. 12. X.

The *Anconæus*, *Bidloe* Tab. 69. *prope* B.

The *Palmaris Longus*, *Bidloe* Tab. 6 B. C.

The *Palmaris Brevis ſeu Caro Muſcu Quadrata*, *Bidloe* Tab. 64. K, *Spigelius* lib. c. 35.

The *Muſculus Perforatus* of the Finge *Bidloe* Tab. 67.

The *Muſculus Perforans. Idem*, ibid.

The *Lumbricales*, *Idem* Tab. 67. M, M, M, M.

The *Extenſor Digitorum Communis ſeu D gitorum Tenſor*, *Bidloe* Tab. 69. G.

The *Extenſor Indicis ſeu Indicator*, *Bid* Tab. 70. Not Letter'd.

The *Abductor Indicis*, *Bidloe* Tab. 68. H.

The *Extenſor Minimi Digiti*, *Bidloe* Tab. & 71. K. L.

The *Flexor Tertii Internodii ſive Longi mus Pollicis*, *Bidloe* Tab. 68. L.

The *Abductor Pollicis*, *Bidloe* Tab. 64. I.

The *Flexor Primi & Secundi Oſſis Polli Bidloe* Tab. 68. M. N, N. O, O. P.

The *Adductor Pollicis*, *Bidloe* Tab. 71. L.

The *Extenſor Primi Internodii Pollicis*, B loe Tab. 70. Not Letter'd.

The *Extenſor Secundi Internodii Polli Bidloe* Tab. 70 & 71. Not Letter'd.

The *Extenſor Tertii Internodii Oſſis Polli Bidloe* Tab. 70. C.

The *Flexor Carpi Radialis*, *Bidloe* T 68. E.

The *Flexor Carpi Ulnaris*, *Idem*, ibid. Letter'd.

Extenſor Carpi Radialis, *Bidloe* Tab. D. F.

The *Extenſor Carpi Ulnaris*, *Idem*, ibid.

The *Pronator Radii Teres*, *Veſalius* Tab. 4.

The *Pronator Radii Quadratus*, *Bidloe* 68. B.

The *Supinator Radii Longus*, *Idem*, ibid.

The *Supinator Radii Brevis*, *Bidloe* 71. G.

The *Pſoas Magnus ſeu Lumbalis*, *Veſ* M. Tab. 8. Θ. *Bidloe* Tab. 52. K, K.

The *Iliacus Internus*, *Bidloe* Tab. 52. N.

The *Pectinæus*, *Spigelius* lib. 4. Tab. Not Letter'd.

The *Glutæus Major*, *Veſalius* Tab. 9. 10. K. *Spigelius* Tab. 29. lib. 4. G, G.

The *Glutæus Medius*, *Veſalius* M. Tab. Σ. *Bidloe* Tab. 72. D. F. *Spigelius* Tab. lib. 4. L, L.

The *Glutæus Minor*, *Veſalius* M. Tab. 11. *Spigelius* Tab. 30. lib. 4. G, G.

The *Pyriformis ſeu Iliacus Externus*, *Veſalius* M. Tab. 10. b. *Spigelius* Tab. 29. lib. 4. M.

The *Marſupialis ſeu Burſalis*, *Spigelius* lib. 4. b. 29. Q, Q.

The *Quadratus Femoris*, *Spigelius* Tab. 29. 4. Not Letter'd.

The *Triceps Femoris*, *Veſalius* M. Tab. 12. *Spigelius* Tab. 32. lib. 4. A, A. D, D. G.

The *Obturator Externus*, *Spigelius* Tab. 32. 4. H.

The *Membranoſus*, *Veſalius* M. Tab. 4. 3. *gelius* Tab. 34. lib. 4. R, R. S, S.

The *Sartorius*, *Veſalius* M. Tab. 1. o. *Spi-ius* Tab. 34. lib. 4. A, A.

The *Gracilis*, *Veſalius* M. Tab. 1. *Spigelius* b. 34. lib. 4. F, F.

The *Seminervoſus ſeu Semitendinoſus*, *Veſalius* Tab. 9. t, t. *Spigelius* Tab. 33. lib. 4. L.

The *Semimembranoſus*, *Veſalius* M. Tab. 9. u. *Spigelius* Tab. 32. lib. 4. K.

The *Biceps Femoris*, *Veſalius* M. Tab. 9. ſ. b. 10. *Spigelius* Tab. 33. lib. 4. M. V. X.

The *Poplitæus*, *Veſalius* M. Tab. 14. 5.

The *Rectus Femoris*, *Veſalius* M. Tab. 1. S. *gelius* Tab. 34. lib. 4. a, a. *Idem* Tab. 35. A. E, E.

The *Vaſtus Externus*, *Veſalius* M. Tab. 1. *Idem* Tab. 2. t. *Spigelius* Tab. 35. lib. 4. G.

The *Vaſtus Internus*, *Veſalius* M. Tab. 1. *Spigelius* Tab. 35. lib. 4. L, L.

The *Cruræus Scutemoreus*, *Veſalius* M. Tab. 1, *Spigelius* Tab. 35. lib. 4. K, K.

The *Gaſtrocnemius* ibid. *Gemellus*, *Veſalius* M. Tab. 9. *Spigelius* Tab. 38. lib. 4. Fig. I. G, G. D. E. *Bidloe* Tab. 83. E.

The *Plantaris*, *Veſalius* M. Tab. 13. Φ. *Spigelius* Tab. 38. lib. 4. Fig. II. I. K, K.

The *Gaſtrocnemius Internus*, *Veſalius* M. Tab. 14. *Spigelius* Tab. 38. lib. 4. Fig. II. L, M. *Bidloe* Tab. 84. F.

The *Tibialis Anticus*, *Veſalius* M. Tab. 1. Z. *Spigelius* Tab. 40. N, N. O. Fig. II. *Bidloe* Tab. 80. D. Tab. 81. E.

The *Peronæus Primus*, *Veſalius* M. Tab. 1. S. *Spigelius* Tab. 40. Fig. II. C. D. *Bidloe* Tab. 81. 80. C.

The *Peroneus Secundus*, *Veſalius* M. Tab. 6. *Spigelius* Tab. 40. lib. 4. Fig. II. E, E. F. *Bidloe* Tab. 82. B.

The *Tibialis Poſticus*, *Bidloe* Tab. 85. G. *Veſalius* M. Tab. 15. D. K

The *Extenſor Pollicis Longus*, *Veſalius* M. Tab. 4. 14. *Spigelius* Tab. 40. lib. 4. Fig. II. L. *Bidloe* Tab. 81. H. T. 82. G.

The *Extenſor Pollicis Brevis*, *Bidloe* Tab. 82. Not Letter'd.

The *Flexor Pollicis Longus*, *Bidloe* Tab. 84. Not Letter'd. T, T. 85. K.

Flexor Pollicis Brevis, *Bidloe* Tab. 86. Fig. I. Not Letter'd.

The *Abductor Pollicis*, *Bidloe* Tab. 86. Fig. II. C, C.

The *Adductor Pollicis*, *Bidloe* Tab. 86. Fig. II. D.

The *Extenſor Digitorum Pedis Longus*, *Veſalius* M. Tab. 1. 4. B. *Bidloe* Tab. 82. D.

The *Extenſor Digitorum Brevis*, *Veſalius* M. Tab. 6. *Bidloe* Tab. 82. F.

The *Perforatus*, *Veſalius* M. Tab. 14. 9. *Spigelius* Tab. 42. Fig. II. C. D. *Bidloe* Tab. 85. L.

The *Perforans*, *Veſalius* M. Tab. 15. P. *Bidloe* Tab. 85. H.

The *Lumbricales*, *Spigelius* Tab. 42. Fig. III. F, F. *Bidloe* Tab. 86. F, F. *Bidloe* Tab. 86. Fig. I. F, F.

The *Abductor Minimi Digiti*, *Spigelius* Tab. 42. lib. 4. Fig. III. K. M. *Bidloe* Tab. 86. Fig. I. B.

The *Tranſverſalis Pedis*, *Bidloe* Tab. 86. Fig. II. E.

The *Interoſſei Pedis*, *Spigelius* Tab. 43. lib. 4. Fig. II. D, D. C, C. *Bidloe* Tab. 86. Fig. III. A, A, A.

Cowper the *Cutis* A, A.

The *Vena Preputii* K. *Lymphaducts* L, L. Fig. X.

The *Glandulæ Odoriferæ* a, a.

The *Frænum* a, the *Glans* A.

The *Dorſum Penis* c, c. Its great Vein I.

Inferior Branches of Arteries, g, g. Superior Branches h, h.

Veins and Cells of the *Penis*, *Muſculi Acceleratores*, &c.

The Nerves H, H. Fig. X. Fig. CXXXIV.

The *Corpora Cavernoſa Penis* B, B. Fig. X. d. XII. G, G. Nerves and Blood Veſſels d, d.

The *Urethra*, B. The *Dorſum Penis* d. e.

The Bulb of a Dog's *Penis* D. E. Fig. XVI. The *Urethra* B.

The *Muſculus Accelerator Urinæ*, C, C. The lower Part E. of the *Urethra* D.

The *Glans* A. Cells C. in the *Glans* B. the ſuperior bulbous Part A.

A Deſcription of the Eye, with all the Parts thereunto belonging; taken from a particular Treatiſe of the Diſeaſes of the Eye, and the proper Remedies for their Cure: Writ by Monſ. Antoine Maitre-Jan, *Sworn Chirurgeon to the* French *King.*

Of the Eye *and its Diviſion.*

SINCE it is neceſſary to know the Structure of a Part, in order to form a juſt and diſtinct Idea of all the Diſeaſes that it is ſubject to, I ſhall oblige my ſelf in the Explication of the Diſeaſes of the Eye, their Remedies and Operations, to deſcribe all the Parts that compoſe that Organ: This Deſcription ſhall be very ſuccinct, in reſpect to the external Parts, in which I ſhall entirely agree with other Anatomiſts, but only make ſome particular Obſervations upon thoſe Parts which form the Globe or Ball of the Eye, and then lay down my Conjectures concerning the Nouriſhment of the *Vitreum* or Cryſtalline Body, and the riſe and Support of the Aqueous Humour: And in ſhort, I ſhall diſcover the true Uſe of the principal Parts of the Eye, in order to explain the Nature of the Sight; which I ſhall maintain by ſeveral Experiments in Opticks.

To begin this Deſcription, I ſay, that the Eye, which is the Inſtrument of Sight, is an Organick Part, compos'd of Membranes of a different Nature, of Nerves, Veins, Arteries, Muſcles, Glands, tranſparent Bodies, of a particular Moiſture and ſome other Parts: That its Figure is Spherick, without conſidering the Ball as ſeparated from the other Parts which encloſe it, and if join'd with thoſe, that it is Oblong and Pyramidal, having its Baſe outwardly and the Point within, when placed in the Orbit, or it moves different Ways, and that it is covered by the Eyelids.

I ſhall divide the Eye after the uſual Method of other Anatomiſts into the Ball, and whatever is enclos'd within that and the *Cornea*, and into the external Parts, which are the Muſcles, the Glands, the Fat, the Nerves, the Veſſels, and the Eyelids.

Of the external Parts of the Eye; and firſt of the Eyelids.

THE Order of Diſſection obliges me to begin with the Eyelids, becauſe they preſent themſelves firſt to view: There are two Lids belonging to each; one above, and the other below, the Upper is much larger in Mankind: Their Figures or Shapes are ſo well known, they ſtand in no need of Diſſection. The Parts where both Eyelids join together or unite themſelves, are call'd the Angles: That on the Side of the Noſe is called the inward or great Angle, and that towards the Temple, the external or ſmall Angle.

The Eyelids are compos'd of the Skin, a carneous or fleſhy Membrane, a Membrane as 'tis thought peculiar of Muſcles, the *Tarſus* and the *Eyelaſhes*.

The Skin of the Eyelids is the ſame with that which covers the other Parts of the Face, only it is much thinner, looſer and eaſier to extend, fold or wrinkle; it terminates on the Edge of each Eyelid, or elſe is bored ſo as to give way to the Paſſage of the Eyelaſhes. In this Place is join'd and continued to it another Membrane ſtrongly united, which is thin and exquiſite, and

which lines the internal Part of the Eye-lids, and joins it ſelf ſo intimately with the other, that they become as one, and the upper Skin of the ſame Part is likewiſe cover'd with a very thin tranſparent Membrane, continuing it ſelf, and covering not only the Conjunction, but alſo all the tranſparent *Cornea*, or Horny Tunicle. Anatomiſts believe that the ſaid laſt Membrane ariſes from the *Pericranium*, and that is the reaſon why it is ſo ſenſible.

Betwixt this Membrane and the Skin, you meet with a carneous Membrane, which is nothing elſe but an Extenſion of the orbicular Muſcles of the Eyelids: It is at the Extremity of this Membrane, that there adheres a little membranous Cartilage, Archwiſe or Semicircular, which gives this Figure to the Eyelids, holding out or extending the Skin according to their Length: They call this the *Tarſus* or Comb, becauſe of the Eyelaſhes, which are ſo many ſtrait Hairs of a certain Size, and diſpos'd like the Teeth of a *Comb*.

There are three Muſcles that move the Eyelids: The firſt and ſecond which meet beneath from the Skin of the Eyelids are call'd, *Orbiculares* or *Semicirculares*: They ariſe one and the other from the large Angle of the Eye, the Superior paſſing by the upper Eyelid, and the Inferior by the lower, and when they act they draw at one and the ſame Time the upper Eyelid down and the under Eyelid up, and exactly ſhut the Eyes. The Third Muſcle is the *Elevator* of the upper Eyelid; it ariſes from the Bottom of the Orbit, juſt before the Orifice, by which the Optick Nerve paſſes; and reſting upon the Muſcle which is the Elevator of the Eye, from a ſtraight and carneous Beginning, it terminates it ſelf in a Tendon as large as the *Tarſus*, and on the Edge of the upper Eyelid; for when it acts, it raiſes the Eyelid up, and uncovers the Eye. The Uſe of the Eyelids are to cover the Eyes, to preſerve them from external Injuries, and by their Motion to diffuſe the Liquor which ouſes out of the Glands equally over the whole Eye, in ſhort to moiſten the *Cornea*, to poliſh clean and make the Eye more bright. Above each upper Eyelid are the Eyebrows, which, beſides their Ornament, ſerve to turn off the Sweat from incommoding the Eyes, they are too viſible to need any Deſcription.

Of the Glands and Fat of the Eye.

THat which is commonly call'd the *Glandula Lacrimalis*, is a little *Caruncle* or *glandulous Fleſh*, ſeated at the great Angle or Corner of the Eye at the Entrance of the lacrimal Duct, which is ſeated at the Paſſage or Head of the Veſſel, thro' which the Tears flow out and run down the Noſe, and this Duct or rather Bag, is an Extenſion of the inward Membrane of the Noſe, likewiſe the Membrane that forms the ſaid Bag is glandulous, ſince all the Membranes which ſupply the internal Parts of the Noſe are ſo. Here are two very ſmall lacrimal Orifices which open themſelves towards the Edge of the Eyelids, in the Pit or Socket of the great Angle.

On the Outſide of the upper Eyelid, at the Entrance into the Orbit, there is another Gland which has no Name, but may very reaſonably be call'd a lacrimal Gland, as well for its Size as Uſe, it begins at the little Corner of the Eye, and continues it ſelf almoſt to the great One, and is pretty broad and thick: It is ſometimes found divided into ſeveral Glands, and oftentimes different in their Reſemblance: From the ſaid Gland ariſes ſtraight and nervous Lines which convey themſelves along the inward Membrane of the Eyelids, and which it is thought at laſt enter themſelves near the Eyelaſhes.

The Glands of the Eyes, as all the other Glands of the Body, have their excretory Ducts, their Nerves, Arteries and Veins; their Nerves are principally ſome Branchings from the fifth Pair, which is the third Pair of the Ancients, and they receive Aſſiſtance likewiſe conſiderably from other Pairs which paſs to and again thro' the Orbits; their Arteries come from the *Carotides*, and their Veins diſcharge themſelves into the Jugulars.

The Uſe of all theſe Glands is to filter without Intermiſſion a certain Liquor which is convey'd by the excretory Ducts to water the Eye. Some Anatomiſts pretend, that when there is more Quantity than ordinary ſeparated, the Superfluity paſſing by

thoſe lacrimal Orifices near the great Corner of the Eye, enters into the lacrimal Bag, and diſcharges it ſelf at laſt by the Canal of the Noſe, but becauſe ſo large a Quantity is to be diſcharged, and theſe Orifices not appearing big enough to give it Paſſage, it is obliged to run along the Eyelids in Tears.

There lies in the *Orbit* a good quantity of Fat that ſurrounds the Eye, and fills up the Spaces of the Muſcles, lubricates the Innominate Gland and the Veſſels, makes the Eye more lively, moiſtens ſo that the Motions are more free, and renders the Form of it more graceful.

Of the Muſcles of the Eye.

AS all the Parts which lie together and uphold the Eye in its Orbit are ſoft and ſlippery, that the Eye may move different Ways with Eaſe; ſo theſe Motions are perform'd by Means or Aſſiſtance of the Muſcles, which are ſtraight, to make the Motions ſtraight, and oblique to make the Motions ſo.

Here are four ſtraight Muſcles and two oblique Ones, which take their Names from their Situation, and the Action they perform; the Firſt of the ſtraight Ones is ſeated in the upper Part of the Eye to lift it up, and is call'd the *Elevator*; the Second, which is directly oppoſite to it, is to pull the Eye down, and is call'd the *Depreſſor*: The Third and Fourth ſort are placed on the Sides, and draw the Eye from one Corner to the other; and theſe receive the Names of *Adductor* and *Abductor*. The two oblique *Muſcles* are the *Superior* and *Inferior*; the *Superior* has its Riſe from the Bottom of the Orbit, almoſt from the ſame Place whence the *Adductor* comes, there it terminates in a ſmall round long Tendon, which paſſes by an Orifice made by a little Cartilage, which the Ancients, from its Uſe call'd the *Pully*, placed into the great Angle near the *Caruncula Lacrimalis*, and turning back again, and dilating it ſelf almoſt into the right Angle, it aſcends obliquely by the upper Part of the Eye, and inſerts it ſelf from the *Cornea* at the Side of the *Iris* towards the little Angle. The *Obliquus Inferior* ariſes from the lower Part, and almoſt externally from the Orbit of the great Angle, and advances obliquely to the Inner Angle by the lower Part of the Globe of the Eye, it unites its Tendon to that of the *Obliquus Superior*, terminating likewiſe in the *Cornea* on the Side of the *Iris*. The two Muſcles act variouſly, drawing the Globe of the Eye from the Side of the Noſe, ſo as to turn it a little either upwards or downwards, and it is from their Motions they are call'd the amorous or wanton Muſcles; and when they act together, they draw and keep the Eye fixed to the Noſe ſide.

Of the Nerves, Arteries and Veins diſtributed thro' the ſaid Parts.

ALL the external Parts of the Eye about which I write here, have Nerves for the conveyance of Animal Spirits, Arteries to furniſh them with Nutrition, and Veins to carry back the Superfluity of the Nouriſhment. The Nerves moſt conſiderable, are the third Pair of the Moderns, the ſecond of the Ancients, call'd *Motores Oculi*, the Movers of the Eye; theſe take their Riſe from the Baſis of the medullary Subſtance entring from the *Cranium* into the Orbit, and diſperſing themſelves into all the Muſcles appointed for the Motion of the Eye, and to furniſh likewiſe ſome Branches to the Muſcles of the Eyelids. Beſides theſe, there are the fourth Pair, call'd the *Patheticks* of the Eyes; the fifth Pair which is the Third of the Ancients; the ſixth Pair which is the Fourth, and the ſeventh Pair which is the fifth Pair of the Ancients, which after it has entred into the *Apophyſis* of the *Maſtoides* and *Petroides*, ſends ſome Ramifications to the internal Ear, the Face and other Parts. The Arteries which ſupply the Eyes, come from ſome Diviſions of the *Carotides*, whoſe internal Trunk ſends Branches to the Eye, the ſame with the Temples and other Parts of the Face, the internal Trunk, which being ſeated in the Head, ſends a Branch which attends the Optick Nerve, and diſtributes it ſelf over all the Eye. The Veins which employ themſelves hence, are

f the Eyelids, the Glands, and ſome others hich fall into the external Jugulars, and ll the reſt into the internal Jugulars.

Of the Ball of the Eye, and firſt of the Common Membranes.

THE Globe or Ball of the Eye is com- pos'd of Membranes of a tranſparent art and an Humour: The Membranes are ſually divided into Common Membranes nd Proper; the Common are reckon'd two, e *Conjunctive* and *Innominate*; but, beſides heſe, I ſhall mention a Third, which is xternal, and is a Continuity of the parti- ular Membrane which cloaths the inward art of the Eyelid, which reſts it ſelf upon e *Conjunctive*, adhering and continuing it lf with that, to the Side of the tranſpa- nt *Cornea*. The Second is the ſaid *con- nctive Membrane*, becauſe it holds the ye in the Orbit, and ariſes from the *Peri- anium*, or rather is one continuance of e ſame, which ſtretches it ſelf round the ircumference of the Orbit, juſt to the anſparent *Cornea*. The Third is called the *nominate* by a certain Caprice of the Ana- miſts: It is form'd by the Tendons of the uſcles of the Eye, which turn themſelves to a large *Aponeuroſis*, which is ſmooth twixt the *Cornea* and the conjunctive embrane to which it adheres, and conti- es it ſelf almoſt to the Side of the tranſ- rent *Cornea*, as I have ſaid before, ſpeak- g of the ſtraight Muſcles. Beſides this, e conjunctive Part which covers the Eye, call'd the *White of the Eye*, by Reaſon of e Whiteneſs of the Membrane which com- oſes it, and is the Cauſe of the three embranes knitting one over the other, d particularly the External, which is the oſt looſely ſtretched, which in a violent phthalmy, makes the White of the Eye ow oftentimes to ſuch an exceſſive Extent, to cover all the tra parent *Cornea*: The ternal Trunk of the *Carotides* likewiſe fur- ſhes the Conjunctive with Blood neceſſa- for its Nutrition, the ſame as the Eye- s by a great Number of little Bran- es almoſt imperceptible, which convey emſelves by different Paſſages upon the perficies of the ſaid Membrane, notwith- ſtanding the Principal of 'em paſs on the Side of the great Angle of the Eye, and the Superfluity of the Blood is carried back by the Veins of the external Jugulars.

Of the proper Membranes, and firſt of the Cornea.

THE proper Membranes are Three, the *Cornea*, the *Uvea*, and the *Retina*. The *Cornea* is much the largeſt of the ſaid Membranes, ſince it is that which forms the Ball of the Eye. It is hard and thick, and the Thickneſs unequal, it being prominent towards the Bottom, and inſenſibly decreaſes at the Top: It is opaque behind, ſmooth and tranſparent before; whence it is, that ſome Anatomiſts have divided it into that tranſparent Part call'd the *Cornea*, and the opaque Part term'd the *Selerotick* or hard.

Of the Uvea.

THE Membrane which is immediately under the *Cornea*, is call'd the *Uvea* for its Reſemblance to the Skin of the *Raiſin* and ſometimes the *Chorion*, becauſe it is in the ſame Nature of the *Chorion* that ſurrounds and contains the Infant in the Womb. This Membrane comprehends the principal Parts appointed for the Sight, and receives and ſupports the Veſſels, which are to be diſtributed thro' the ſame Parts. It is a great deal thinner than the *Cornea*, and is very delicate, being eaſily torn in Pieces. It appears very obſcure throughout the Whole, and will ſuffer no Light to enter otherwiſe than by its fore Part, and that occaſion'd by a black Colour wherewith it is ſpread over, which in Man and ſeveral other Animals renders the ſaid Membrane very black, which does not equally extend it ſelf thro' all the Parts thereof, but is more ſo in the exterior Part which touches the *Cornea*, and in the interior Surface of the *Iris*, which is in the internal Part of the Side of the *Retina* or Tunicle of the Eye, and in the fore Part of the *Iris*.

The *Iris* is that Part of the *Uvea* which is ſeen towards the tranſparent *Cornea*, ſo call'd from its Diverſity or Mixture of Colours, which are obſerv'd to be either Grey,

Blue, Yellow, or Black; and it is believed that the Colours follow the different Temperament of the Brain and the Eyes, and that they are more or less lively as the Spirits are agitated, the predominant Colour of the *Iris* giving the Name to the Eye; so that it is called a Black or Blue Eye, according as the *Iris* is mix'd with those Colours.

Of the Retina, *and the* Optick Nerve.

BEfore I speak of the *Retina* or *Tunicle of the Eye*, I shall give a Description of the *Optick Nerve*, as having the same Continuity with that Membrane. The Optick is the first Pair of Nerves of the Ancients, and the Second of the Moderns. They take their Rise from the upper Part of the Medullary Substance of the Brain, which *Galen* calls the Bed of the Optick Nerves, and after they have divided themselves, and are gone out of the *Cranium*, they enter into the Orbit, and insert themselves at the Bottom of the *Cornea*. These Nerves are much the thickest of all those which come from the Brain. They are likewise the best supplied with that Medullary Substance, and furnished with every Thing that the other Nerves have from the *Dura* and *Pia Mater*.

Anatomists have disputed whether these Nerves unite with each other, or run crossways; that is to say, if one of the Nerves that rises on the right Side of the Brain go to the Left Eye, and that of the Left Side pass to the Right Eye; or else that they join by a Mixture of their Substance, or by simple Union; but from an Observation of *Vesalius*, it is decided for the latter, who having examined a Person who had an emaciated Eye and a sound one, wherein he found the Optick Nerve of the emaciated Eye wasted away as well as the Eye it self, and not the contrary Nerve, according to the former Opinion.

In Relation to the *Retina* or *Tunicle*, it is nothing but the fine Texture or Weaving of the Extremities of the Medullary Fibres, curiously wrought into the Fashion of a Membrane, which is with good Reason supposed to be no more than the Dilatation of the same Fibres. This Membrane is seated directly under the *Uvea*, and surrounds all the back Part of the *Vitreum* or glassy Body from the Membrane, to which it is tied by certain Fibres extreamly fine, to the Parts where the Body joins it self to the Circle of the Eyebrows, and terminates at last about the Eyebrows, to which it is fix'd. As this Membrane appears to be an Extension of the Medullary Fibres of the Optick Nerve, which is white in Men and many Animals, and is very soft; and as it is seated immediately behind the *Vitreum*, our Modern Anatomists, have with just Reason assign'd it to be the Foundation of Sight; for indeed it is the only Part capable of receiving the Images of the Objects; I would say the Impressions of the Rays of Light, reflected and differently modified by the different Superficies of Bodies which strike upon it.

Of the Parts of the transparent Bodies, and First of the Glassy Body called Vitreum.

THere are two Parts or transparent Bodies in the Eye, the *Glassy* and the *Crystalline* The Glassy Body is a Composition of Membranes and transparent Fibres, which contain an Humour very near resembling the *Aqueous Humour*. The Membranes and the Fibres of this Body are so delicate, and so transparent, that it is impossible without extraordinary Art to distinguish the Humour which they contain; but those who shall discover the said Humour, will find that the following Observations are just,

First, That the Membrane which receives the *Vitreum* is porous in all its Parts; that the Humour will sweat every where when the Body is placed upon a Board, and will away presently when boil'd in Water, because the Humour rarifying it self by the Heat of the Water, is obliged to evaporate by the Pores of the Membrane. In the next Place, that the Membranes or membranous Fibres are made up of a Quantity of Cells fit for the containing of the said Humour; and in the Third Place, that these Cells have a reciprocal Communication the one to the other, by very small Passages or Channels from whence it comes, that when you prick or break the Membrane which receives the

Body in ſome Places, theſe Cells empty themſelves one after the other; but when preſs'd gently, the Humour flows more plentifully from the whole.

These Reaſons ſeem to me ſufficient to ſatisfy any Perſon that the *Vitreum* is not a coagulated or thicken'd Maſs, as is commonly believed; but as I have ſaid, it is a Compoſition of Membranes, Fibres, and a fluid Humour.

The *Vitreum* fills all that Space that appears betwixt the Circle of the Eye, the Cryſtalline, and the Tunicle; that is to ſay, the two Thirds about the Ball of the Eye. As it is very pliable, it is more readily accommodated to the Place it poſſeſſes. Likewiſe the back Part of it is ſpherick, and the fore Part is ſunk into that Part where the Cryſtalline is lodged.

Of the tranſparent Body of the Eye called the Cryſtalline.

THE few Tryals that the Ancients made of the *Cryſtalline*, is the Reaſon why that Part was ſo little known; for from its Tranſparency, Softneſs, and Viſcoſity, they concluded it to be a thick coagulated Humour like that of the *Vitreum*, which I have already affirm'd to be a Part compoſed of Membranes, Fibres, and a fluid Humour: And I muſt inform you, that the *Cryſtalline* is a Body altogether particular in its own Nature; but as the Softneſs and Tranſparency of its Bodies are too great to admit of a Diſſection in the natural State we find it, I have diſcover'd Means to harden the ſaid Softneſs, and ſucceed after the following Methods.

Firſt, I heat Water juſt till it is ready to boil, in which I plunge a *Cryſtalline Humour* freſh taken from the Animal; and when all the Superficies in View begins to whiten, I boil the Water again and again, till I obſerve that the Whiteneſs increaſes according to the Solidity. I continue the Boiling on ſome Moments, and then take the *Cryſtalline* from the Water. Afterwards I perceive that the Superficies is ſomething unequal and rugged, and the reſt I find ſolid and white, without any Tranſparency, preſerving the Figure or Shape it had before Boiling; and in that Condition I diſſect it, as I ſhall tell you afterwards.

In the next Place I open the Eye of a Man or a Beaſt, and find the *Vitreum* and the *Cryſtalline*, which I leave tied together, without hurting the Membrane which joins them. I do the ſame by the Circle of the Eye, which I endeavour to preſerve entire all I can poſſibly. Nevertheleſs I ſeparate the greateſt Part of the *Uvea*, becauſe of its Blackneſs. I put the whole into a Water compoſed of three Parts of common Water and one of *Aqua Fortis* mix'd together. In a little Time after, the Membrane that covers the *Vitreum*, and ſurrounds the *Cryſtalline*, becomes a little diſturbed; and then the *Cryſtalline* grows white, and by Degrees harder and harder, till it is intirely penetrated by the Acid of the *Aqua Fortis*, and becomes of one and the ſame Conſiſtence. Likewiſe I leave it after that 24 Hours, and then take it out of the Water, and obſerve without Diſſection, Firſt, that the Membrane which covers the *Cryſtalline* is a Continuity of that of the *Vitreum*; and Secondly, that the internal Face of the Circle of the Eye is lightly glued upon the Membrane of the *Vitreum*; and by the Circle gently adhering, I obſerved alſo diſtinctly, that the Channels which are betwixt the ſtrait and parallel Fibres anſwer to thoſe which are upon the Membrane of the *Vitreum*.

I examined anatomically the two *Cryſtallines* I had prepared, but ſtuck the moſt to that which was done with the *Aqua Fortis*, becauſe it was much eaſier to open or diſſect; that the Fibres were more pliant, and the *Superficies* not at all changed; beſides that it was the beſt Method or Way of preparing them. I obſerved at firſt Sight, that the *Cryſtalline* was no other than a Maſs of *Pellicles* or *Scales*, as they may juſtly be called, which are very ſmall, thin and clear, which form each their Sphere, and are incloſed one within another like a Neſt of Boxes, or as the different Blades or Pellicles that compoſe an *Onion*. All theſe Pellicles are formed by a Quantity of very fine delicate Fibres, that are crooked, and run backwards and forwards, and forwards and backwards. And it is this Conſtitution of

Fibres which is the Reaſon that the *Cryſtalline* breaks eaſily from before backwards, and with great Difficulty the contrary Way.

I likewiſe open by the Pellicles all the *Cryſtalline*, even to the Center, and obſerve in the Opening, that the Pellicles are leſs towards the *Superficies*, and that they harden conſiderably as they approach to the Center; that their Colour is of a fine White, and when examined with a Convex Glaſs, the White appears a little bluiſh; that the Center is very hard, and ſtill retains a little of its Tranſparency. I obſerve beſides, that the Fibres which form the Pellicles are thicker towards the Side of the *Cryſtalline*, and diminiſh as they approach forwards, and convey themſelves backwards. It is the very ſame Thing that thoſe of the ſuperficial Pellicles do not unite themſelves backwards and forwards with thoſe that are their Oppoſites.

After having examined the *Cryſtalline* as before, and according to ſeveral other Preparations, I tried it without any Preparation at all, but in the natural State, as we find it in the Eye; and firſt I obſerve, that it is ſeated in the Middle of the fore Part of the *Vitreum*, over-againſt the *Foramen* of the *Uvea*, which is retained firmly in its Place by the Membrane of the *Vitreum*, which, as I have ſaid, divides it ſelf into two Membranes, the one continuing to ſurround the fore Part of the *Vitreum*, and the other paſſing above the *Cryſtalline*, takes in all that Part which cannot change its Situation. In the next Place, that the Figure in Men and many other Animals is round and depreſs'd, ſomething reſembling that of the Lentil. Likewiſe that there are two Faces, the one forward, which is much leſs, and more depreſſed; the other backward, which is more extended, more prominent, and a little lengthened, in Shape of a Cone. It is this Face which is ſunk into the *Vitreum*. Thirdly, it is of a very fine tranſparent Subſtance, imitating that of the Cryſtal, from whence it takes its Name; and Laſtly, I obſerve, that the Cryſtalline is of a ſoft Subſtance, very fine and tranſparent, that it hardens by the Heat of the Water, and by the Acids; beſides which, that it was of a particular Kind, that the Particles which compoſe it are ſo crowded one againſt the other, that it is one of the heavieſt Bodies to be met with in Man, or any other Animals, in Proportion to the Size; ſo that if it be caſt into a Glaſs of Water, it falls to the Bottom, juſt like a Stone. The ſame plunged into Spirit of *Vitriol*, or *Aqua Fortis*, which are heavy Liquors, precipitates leiſurely, becauſe of the Weight of the Body which oppoſes it.

Of the Aqueous Humour.

WHat I have ſaid before of the Glaſſy and the Cryſtalline Bodies may ſerve here for Satisfaction, that the aqueous Humour is not congealed, any more than the glaſſy or Cryſtalline Bodies were ſaid to be coagulated; but tho' this is called the *Aqueous Humour*, it does not ſo entirely reſemble Water, becauſe it has a Viſcoſity which Water has not; and this Viſcoſity is ſufficiently known in the Operation of Couching the *Cataract*; whence this Humour flows more or leſs thro' the Orifice which is made with the Needle.

The *Aqueous Humour* fills all that Space which is betwixt the tranſparent *Cornea*, the *Cryſtalline*, and the anterior Side of the *Vitreum*: Likewiſe the Part of the *Uvea* which forms the *Iris* is bathed in the ſaid Humour. It cannot paſs by the Bottom of the Eye, becauſe the *Vitreum* poſſeſſes that Part entirely; from whence it comes that in Birds is ſomething leſs a Proportion to the Globe of the Eye than in Men and other Animals. And ſince the ſaid Humour flows by a Point of the *Cornea*, or is diminiſhed by ſome Violence, or extreme old Age, the Globe of the Eye ſinks, the *Iris* grows wrinkled, and the Pain is great in diſcerning the Objects.

Of the Circle of the Eye.

HAving ſpoke of the *Uvea*, the Tunicle and the two tranſparent Bodies, I am obliged to ſay ſomething of the Circle of the Eye, becauſe all theſe Parts are tied together. This Circle is as a common Place for retaining the Situation, and guarding the Eye. This Circle is a Sort of little Crown which ſupports the *Uvea* before it forms the *Iris*, and which in ſome Meaſure makes a Part of the ſame *Uvea*; which is nevertheleſs of a different Subſtance, and which glo-

nd knits the ſaid Membrane to the Side of
e inward Part of the opaque *Cornea* to-
ards the tranſparent Body. The Circle is
iſcovered on the Outſide of the ſaid Mem-
ane when it is ſeparated from the *Cornea*;
s it is whiter in Man than other Animals.
It is diſtinguiſhed liſtewiſe by Reaſon of the
me Colour that is in the Inſide of the ſaid
Membrane, or is ſeen where it is tied to the
Tunicle, and with the Membrane of the
Vitreum.

If we conſider the particular Structure of
this Circle, and the Union it has with all
the Parts before-mentioned, we may judge
at once that its Uſe is to tie together the
Uvea and the *Cornea*, to give Riſe and Aſ-
ſiſtance to the moving Fibres of the *Iris*, be
of Service to the Inſertion of the *Tunicle*,
and, in ſhort, to hold up, or as it were ſuſ-
pend the *Cryſtalline* oppoſite to the *Pupilla*:
But if we conſider the Subſtance, which is
whitiſh and glandulous, and nothing of
the Nature of a Ligament, the Number of
Nerves, Arteries, and Veins, which are pro-
duced in this Part, and the Uſe of it for diſ-
poſing of the Fibres of the Proceſſes of the
Circle of the Eye, we may without doubt
conclude theſe are deſigned for the Nutri-
tion of the two tranſparent Bodies, and the
Maintenance of the Aqueous Humour.

Of the Diſeaſes of the Eye, containing the Maladies of the Cryſtalline, *commonly known by the Name of* Cataracts; *the various Opinions of the Nature of the* Cataract; *and ſome Reflections upon thoſe Opinions. From the ſame Author.*

WHat the *Greeks* call *Hypochyſis*, or *Hypochyma*; the *Arabians*, *Gutta Obſcura* or *Caliginoſa*; the *Latins*, *Suffuſio*; is one and the ſame Diſeaſe, known commonly by the Name of the *Cataract*. Almoſt all our Authors, from *Galen* to the preſent Times, ſay, that the *Cataract* is a Maſs of ſuperfluous Humour, thick and heavy, which is congealed and hardened like a Pellice in the Aqueous Humour. Some will have it to be betwixt the *Cornea* and the *Cryſtalline*, and others betwixt the *Uvea* and the *Cryſtalline*, ſo as to ſtop the Sight; but thoſe who have fallen into this laſt Error, have done it from an Opinion that the *Cryſtalline* was the principal Inſtrument of Sight, and conſequently of abſolute Neceſſity for ſeeing; the Falſeneſs of which Opinion I ſhall confute in the following Obſervations. In the mean Time I muſt inform you, that the Ancient Phyſicians never imagined that the *Cataract* was a Diſeaſe of the *Cryſtalline*, but rather an Obſtacle which changed the Colour of it; to which Opinion *Galen* agrees to in his Book of the Eyes, where he ſays it is nothing but an Alteration of the *Cryſtalline*.

Oribaſius, who was a long Time after *Galen*, and made an Abridgment of the 47th Chapter of the Eighth Book, ſays, that the Ancients eſteemed the *Glaucoma* and the *Suffuſion* one and the ſame Diſeaſe: *Glaucoma*, ſays he, *& Suffuſionem Veteres unum eumdemque Morbum eſſe exiſtimarunt; Poſteriores vero Glaucomata Humoris Glacialis, qui ex proprio Calore in Glaucum convertatur & mutetur, Morbum eſſe Putaverunt: Suffuſionem vero eſſe Effuſionem Humorum inter Uveam & Cryſtalloidem Tunicam concreſcentium. Caterum Glaucomata omnia Curatione non recipiunt: Suffuſiones vero recipiunt, ſed non omnes.* Theſe two Paſſages prove evidently that the Ancients, among whom we muſt reckon *Hippocrates*, knew of no other *Cataracts* than the Diſeaſes of the *Cryſtalline*, changing the Colour of it, and deſtroying the Tranſparency, and this they called the *Glaucoma*. Theſe are the principal Opinions of the Ancient Phyſicians as to this Point; and tho' it has been long received, yet it is abſolutely falſe; and thoſe Opinions which the Moderns hold, though more reconcileable to Reaſon, muſt not be permitted to paſs for Truth, becauſe they are not agreeable to Experience.

Of the Cataract, *and its ſeveral Kinds or Diviſions.*

AFter the Obſervations and Tryals already made, I am ſatisfied the *Cryſtalline* is affected with ſeveral Diſeaſes, which change either the whole Subſtance, or ſometimes only a Part. The entire Alteration of the *Cryſtalline*, which deſtroys wholly any Part of the tranſparent Body, I call a *Cataract*, and that which is more particular is named a *Stain* or *Spot*. And as in *Cataracts*, the *Cryſtalline* becomes variouſly alter'd, and theſe different Changes ariſe from different Cauſes; I obſerve likewiſe *Cataracts* of a *different Nature*, which I divide by Reaſon of their two prognoſtick Signs, into thoſe that are Curable, Incurable, and ſuch as are very difficult to cure.

By the *curable Cataracts*, I mean thoſe whence the *Cryſtalline* yields to the Needle, and this I call a true or *ſimple Cataract*. By the *incurable Cataracts*, I mean thoſe where the *Cryſtalline* is ſo ſtrongly bound to the Place where it is fix'd, that it cannot be ſeparated: Secondly, thoſe where the *Cryſtalline* is ſo looſe that it gives way, and is carried into all the Parts of the Eye, but without any Advantage to the Malady: And theſe I call Falſe or Baſtard *Cataracts*. By *Cataracts* very difficult to cure, I mean thoſe which partake of the True and the Falſe, and which are more or leſs curable, as they are mixed more or leſs with the True or the Falſe: Theſe I call mix'd or deceitful *Cataracts*, in treating of which, the Reaſons will eaſily appear, that oblig'd me to make this Diviſion, upon which account I ſhall ſay nothing farther of it here.

The true *Cataract* is an Alteration of all the *Cryſtalline*, which changes the Colour, deſtroys the Tranſparency, renders it more ſolid or harder than before, and leſſens it ſomething in Size: Nevertheleſs, ſo as to encreaſe it upon account of a certain mucilaginous Matter which gathers about it, in the Nature of the Apendices which float ſometimes in the *aqueous Humour*, ſo that the Conſequence of the ſaid Alteration is the Loſs of the Sight. To prove the Truth of this Deſcription, I ſhall take Care to relate here a good Number of Obſervations which I have made in working upon *Cataracts*: But leſt too many of them might be burthenſome, becauſe all *Oculiſts* that perform this Operation, make the ſame Obſervations as I do; therefore I ſhall content my ſelf to relate only Two of thoſe, which may ſerve to confute the common Opinions: Afterwards I ſhall lay down another Experiment or Operation I perform'd after the Death of a Perſon labouring under a *Cataract*, upon which no Operation was ever made; and in ſhort, tell you of Two others made after the Death of another Perſon, upon whom I had made an Operation on both Eyes ſometime before his Death.

The firſt Obſervation was made in the Year 1682, when I couch'd a *Cataract* of one *Thomas Mareſchal*: This *Cataract* promis'd well before Operation, but in the time of Couching, after I had introduced the Needle into the Eye, and had looſed or taken off the *Cataract*, I perceiv'd ſomething advance very much forward; when I laid the Needle upon it to couch it, ſomething iſſued forth by the *Pupilla* that was White and very pliable. I readily imagined that it was all the *Cataract* which had paſs'd by the *Pupilla*: Then I chang'd the Situation of my Needle, to carry the Point gently to the upper Part of the *Pupilla*, in order to draw it back, and couch what I had ſeen; but I was ſurpris'd in making this Motion, to ſee a thick Body, white and round, which had nothing of the Form of a Membrane, roul'd about my Needle. I return'd ſeveral times the Point of my Needle to the ſame Bodies and couch'd them, after which I ſaw the Eye very clear, and the Patient cou'd diſtinguiſh common Objects. After having repeated the Work ſeveral times, I withdrew my Needle.

Some days after this, the *Cataract* riſe a little, and I perceived ſomething of the White about the *Pupilla*, which advanced and ſunk with the leaſt Motion of the Eye. I believed then it would precipitate in the End, but was deceived, for after the Patient was cured of the Puncture, that continued and paſſed on till Winter, and it was Autumn e're the Operation was made. The Spring following he came to me again, and

begg'd that I would couch the thick Cloud, that incommoded him ſo much that he was oblig'd to ſhut that Eye, which was as uſeleſs as the other, which had laboured under the *Cataract*, and undergone the Operation eighteen Months before: I went then about it, and moving the Needle about in his Eye, I convey'd it below the *Pupilla* to recover that which I had couched, and perceived preſently that I had raiſed the white round Bodies, as I had obſerved the firſt Time, but which did not appear ſo large: I couch'd him in ſhort the ſecond Time, and ſo left him, and that which appeared before, entirely vaniſh'd. He ſaw of that Eye, as he had done of the firſt, and continued 19 Years, and died not till 1701, when he was very old.

The ſecond Obſervation of the 5th of *October* 1685, was made on the couching of a *Cataract* on the right Eye of a Man, called *Gobin Cordonnier*, living in the *Fauxbourg* of *Paris*. My Needle being in the Eye, I was accidentally hit on the Elbow by one of the Aſſiſtants, that made me move the Needle wrong, and I perceived inſtantly, that almoſt one half of the *Cataract* paſſed by the *Pupilla*: This appeared white and round, as in the former Obſervation; and I obſerv'd much better than I had done before, that the White and the Pliable ſtuck round, and that the Extremities floated in the aqueous Humour; I finiſh'd my Operation as before: The *Cataract* remain'd couch'd, and the Patient cured, only that the *Pupilla* continued dilated, which I apprehended to be very ſtrong: He had nothing now left but this Eye, the other being loſt by the Ignorance of a wandering Quack, who perſwaded him to commit himſelf to his Hands, in order to the Cure of another *Cataract*, which began to form it ſelf when I perform'd the Operation on the right Eye. This Obſervation convinced me clearly of the Error of the common Opinion, and I began from thence to maintain, when ever occaſion offer'd it ſelf, that the *Cataract* was an entire Alteration of the *Cryſtalline*, that it gave me Room to confute a great many Objections which ſeveral Phyſicians and Surgeons had made.

The third Obſervation was ſome time after, when a poor Perſon died in our Hoſpital, after which I took the Eye out from its Orbit, and carried it away with me; having opened it, I obſerv'd that the *Cataract* poſſeſs'd the whole Space of the *Cryſtalline*: In ſhort, after having divided it with the Point of my Knife, I underſtood that it was really the *Cryſtalline* entirely alter'd: I broke it with my Fingers to ſatisfy me the better, and obſerved that the Subſtance was like that of the Cryſtalline infuſed in our acid Liquor, as I have ſaid before.

I was ſorry for having loſt the Remembrance of that Obſervation: Which made me ſtop here, for fear I ſhould impoſe on the Publick, if I ſhould take Notice of other Circumſtances of the ſaid Obſervation, which my Memory might deceive me in.

The fourth Obſervation: At the latter End of *October*, in the Year 1691, a poor Man brought me his Wife who was blind, and deſired me out of Charity to reſtore her to her Sight if it cou'd be done: I examined both her Eyes, which I found affected each with a *Cataract*, that of the right Eye was with a white Perl, a little ſhining, ſufficiently extended and advanced forward. The Foramen or Paſſage of the *Uvea* did not dilate or contract it ſelf quick enough, when I rubb'd the Eyelid and opened it; and in putting my Hand betwixt the Eye and the Sun, ſhe cou'd diſtinguiſh the Shade, and the very ſomething betwixt Light and Darkneſs. Theſe Signs made me judge, that it was ripe and confirm'd, and by the further Relation of the Man and his Wife, I was ſatisfied that the *Cataract* was ready for the Needle.

That of the left Eye was Yellow, it appear'd to be more extended than that of the right Eye, and advanced more forward. The Foramen of the *Uvea* dilated and contracted it ſelf very ſlowly, and it cou'd not ſo well diſtinguiſh the Shade of the Hand or the Light. I judge by the Signs that it was old, and the poor People told me, that it was ſix Years ſince that Eye was loſt: Notwithſtanding which, I did not deſpair of the ſaid *Cataract* ſubmitting to the Needle, becauſe it was a true One, the *Iris* of the one and the other being of a good Colour.

Having

Having prepared the Woman for the Operation, I couched both the *Cataracts* of the firſt of *November* following. That of the right Eye was perform'd without any Trouble, becauſe the *Cryſtalline* remained fix'd during the Couching, and the Patient diſtinguiſh'd preſently all kind of Objects, but as it happens to all in that Caſe, they ſee at firſt a little confuſedly; after this it follow'd, that there was neither Pain or Inflammation in the Eye.

The Operation of the left Eye was much more troubleſome, as well in couching the *Cataract*, as in keeping it down afterwards, it having Riſe three or four Times during the Operation, and after the Operation it riſe a little after the ſame Manner, and the Patient ſaw much leſs of that Eye than of the other, and was afflicted with a light Inflammation, which was carried off entirely in ſeven or eight Days.

Ten Days after the Operation, this poor Woman was perfectly cured, and reſolving to work in this City the remaining Part of the Winter, ſhe was ſeized the firſt of *December* following with a violent *Peripneumonia*, of which ſhe died the ſixth Day, notwithſtanding all my Care. This gave me a favourable Opportunity of informing my ſelf better of what had happen'd after the Operation of the *Cataract*, as well for my own Inſtruction as the Satisfaction of the Publick.

Some hours after the Death of this poor Woman, I took both the Eyes from their Orbits, and carried them away with me, and made the following Obſervations on the right Eye. Having opened the right Eye, I turned it ſeveral ways, I ſhook it often very hard, and ſqueezed it, without the *Cataract* ever changing its Situation: So that I judg'd it was fix'd to the Place where I found it lodg'd during the Operation.

I afterwards cut the *tranſparent Cornea* all about the external Circle of the *Iris*, and I raiſed the Part without injuring the *Iris*: I held, nevertheleſs, the fore Part of the Eye raiſed up, to ſtop the leaſt Confuſion that might happen to the Eye within. The aqueous Humour was drain'd into the Part where I had the Satisfaction to ſee the Traverſe of the *Pupilla*, that the *Cryſtalline* was not more in that place which it had gone out of the Way to fill, which is the mi[d]dle of the fore Part of the *Vitreum*.

That place of the *Vitreum* was rais'd into a Bunch which was very ſmooth, and reſembles the fore Part of the *Cryſtalline*, only that it was not depreſs'd: But then I gently ſunk it down with a Pencil, and it would raiſe it ſelf again immediately after I had removed the Pencil, and would return to its former Figure.

Raiſing the *Uvea* with the End of a Pencil, I perceiv'd the *Cryſtalline* in its lower Part, underneath the *Iris*, where it had kept its Place during the Operation; for the better diſcovering of which, I ſlit the *Cornea* and the *Uvea* croſsways from the Side of the two Angles of the Eye, the Remainder of the aqueous Humour was drained, and having opened both the Membranes, I ſaw the all the *Cryſtalline* of that Part where it was fix'd by the *Vitreum* which was ſunk into the Place which touch'd the *Cryſtalline*, and by a kind of Glue it was paſted ſlightly to the *Uvea*, and the Membrane of the *Vitreum*.

Having wholly remov'd the *Cryſtalline* from the ſaid Place, I obſerv'd that the Fibres of the *Ciliary Circle* which ſpring thence inſert themſelves into the Membrane of the *Vitreum*, at that Place where it divides it ſelf from the Covering of the *Cryſtalline*, were broke and ſeparated from the Circle at that Place where the *Cryſtalline* had been conducted during the Operation, and in that, where the Needle had paſſed, and in thoſe two Places, the *Ciliary Circle* was likewiſe ſeparated from the Membrane of the *Vitreum*, to which it ſtuck.

Examining the *Cryſtalline*, I found that it was covered with two ſorts of Subſtances, the firſt which preſented it ſelf was like *Perl White* very pliant and yielding, which equally ſurrounds the *Cryſtalline*, and touches not any Parts; it reſembles in ſome Meaſure Flakes of Snow or Pieces of Ice floating half in the Water: I call this Subſtance which is compos'd of Scales, *Appendants* on the *Cataract*; becauſe theſe ſorts of Appendixes always are met with more or leſs in the true *Cataract*, when they are more firm'd or ripe.

The ſecond Subſtance covers all the *Cryſtalline*, its Superficies was a little un-

nd rugged, it was white, more ſolid than e Firſt, like the White of an Egg almoſt rd boil'd, and it appear'd to me to be the oper Subſtance of that *Cryſtalline*.

As the ſecond Subſtance reſembling the hite of the Egg hardned, approached the entre of the *Cryſtalline*, it was firmer, and White turn'd a little yellowiſh: And ter having taken away all that Subſtance, e reſt of the *Cryſtalline* appeared to me yelwer and ſolider, notwithſtanding which, was a little tranſparent. Having broke I found it had the Conſiſtence of New heeſe not throughly dried, that would ruiſe under the Finger; that it divided it lf by *Lamina* or Pellicles, that the Fibres hich compos'd it run from the fore Part ckward, and from behind forward, as s been explained already in the Preparaon of the *Cryſtalline* by boiling or in *Aqua rtis*. The *Superficies* was very plain, and eſerv'd its ſpherick Figure; in ſhort, the *ryſtalline* reſembled exactly a *Crſtyalline* preared as I have ſaid, except that it was a litle yellow.

The *Vitreum* was clear and tranſparent as mmon: The aqueous Humour having likewiſe its Purity and Tranſparency as it ed to have, and was in Quantity ſufficit to hold the Ball of the Eye ſo extended. took Care to preſerve all in a Glaſs for rther Examination; in ſhort, I found all e other Parts in their natural State and Siation.

The fifth Obſervation. Having finiſh'd e Examination of the right Eye, I roceeded to the Left, and after the ſame rials, I found equally the ſame Thing at the *Cryſtalline* did not poſſeſs a larger ace than it uſed to do: In the next Place, at the left Eye was at the inferior or wer Part of the *Uvea*, a little more eleted than that of the right Eye, becauſe it e again a little after the Operation, ſo at it diſcovered a very ſmall Part of the *ramen* or Paſſage of the *Uvea*, and likeiſe the *Flakes* or *Attendants* of the *Cataract*, which I have been ſpeaking.

Thirdly, That having a good deal of that ſt Subſtance I mentioned, it was likewiſe ore ſolid and fibrous, making the ſame ring.

Fourthly, That having very little of the ſecond Subſtance, which was abundantly yellower and harder, and that the Superficies was likewiſe a little uneven and rough: All the Remainder of the *Cryſtalline* being alſo leſs, harder, yellower, and not ſo tranſparent as that of the right Eye, having the ſame Diſpoſition of Fibres remaining. In ſhort, that the *Vitreum* and the aqueous Humour was like thoſe of the right Eye, and all the other internal Parts the ſame.

The Cauſes of the true Cataract.

AFter having ſhown that the true *Cataract* is a total Alteration of the *Cryſtalline*, it will be proper to lay down the Cauſes of the ſaid Alteration: Conſidering the Analogy there is betwixt a *Cryſtalline*, remaining ſometime in a Water made up of three Parts of common Water and one of *Aqua Fortis*, as I have already hinted in the Deſcription of the Eye, and a *Cryſtalline* which has loſt its Tranſparency, and is harden'd in its Natural Situation, as it happens in the true *Cataracts*, and ſome of the falſe Ones; I can perceive no Difficulty in imagining the Cauſe of the Blindneſs and Loſs of the Tranſparency of the one, to be little different from the Cauſe of the Blindneſs and Loſs of the Tranſparency of the other.

Likewiſe, I ſuppoſe the Cauſe of *Cataracts* to proceed from a ſharp biting Serum or wateriſh Humour, which ſometimes throws it ſelf upon the Part by way of Defluxion, other ſometimes is collected or gather'd betwixt the *Cryſtalline* and the Membrane which covers it, giving Riſe at firſt to the *Cataract*, which the Diſeaſed diſcovers or perceives by a Light, Miſt or Cloud that hinders the Sight. That this *Serum* acts afterwards upon the Surface of the *Cryſtalline*, in changing without doubt the Diſpoſition, and in taking off ſome Particles not well faſten'd, that float and whirl about in the ſaid *Serum*, appearing to the Patient like ſparks of Fire vaulting in the Air, and that the ſaid watry Humour inſinuates it ſelf more and more, altering likewiſe the *Cryſtalline* in Proportion, by hardening its Subſtance and changing its Colour, after

the ſame Manner as Acids act upon Wax, altering the Subſtance, drying, hardening it, and changing the Colour.

And as the Veſſels which convey the *Nutrition* to the *Cryſtalline* cannot but be deſtroy'd, ſo the ſaid *Nutrition* being Analogous to the Part which it nouriſhes or ſupplies, and mixing with the acid *Serum* before-mentioned, the Parts are more diſpos'd to unite, as we ſee Milk, when mixed with the Acid of the *Rennet*, coagulates or turns to Curd.

It is likewiſe in Part from the nutritious Juice of the *Cryſtalline*, and partly from the Particles which are taken off from the Superficies to which I aſſign the Riſe of theſe Additions or Excreſcencies, which I call the *Attendants of the Cataract:* And accordingly, that the Juice is more or leſs ſupplied from the Veſicular Parts that makes theſe *Attendants* in greater or leſs Quantities, as they are more or leſs pliable.

When theſe *Attendants* begin to form themſelves, it is then that the Patient ſeems to ſee Things flying in the Air, that look like Hairs, Threads, Duſt, flakes of Snow, or Wool and Flies, which are uſually called Conceits or Fancies in the Brain: Becauſe it appears to the Patient as if theſe Things were juſt before his Eyes.

And when theſe Attendants encreaſe, white Clouds begin to be perceiv'd in the Eyes of the Diſeaſed, which grow more and more, according as theſe Attendants become more ſolid, and that the *Cryſtalline* loſes its Tranſparency: Then the Patient is not able to diſtinguiſh any Object, but only a confuſed Light, and the Shades of Opack Bodies, when they are placed betwixt the Eyes and the Light.

This *Acid Serum*, which in acting upon the *Cryſtalline* hardens and dries the Subſtance, and working upon the nutritious Juice, coagulates and gives it a Body, cannot produce the ſame Effect upon the Membrane which covers the *Cryſtalline*; but on the Contrary deſtroys it for the moſt Part, and eats it away, if not entirely, yet in a great Meaſure. And the Reaſon for it, is becauſe theſe membranous Parts are directly nouriſh'd from the Blood, which is brought to them by the Arteries, and this *Serum* inſinuating it ſelf into that Membrane, coagulates the Blood, and ſtops its circular Motion; whence it comes that the Membrane wanting its Nutrition, is waſted away by a kind of Suppuration, after the ſame Manner as other the like Parts of our Body, when they are ſoak'd in any Humour abounding with much Acidity.

The Differences of true Cataracts.

THE *true Cataracts* differ not among themſelves otherways than from their Age, their Size or Extent, and their Colour by Reaſon of their Age; they are either Riſing and Imperfect, or Confirm'd and Perfect; the *Cataract* is riſing when the *Cryſtalline* begins to change it ſelf, and the Attendants begin to form, ſo that they appear like white Clouds acroſs the *Pupilla*. There are two Sorts, the *Milky* and the *Cheeſy*, which have no other Difference but in Conſiſtence, for every *Cataract* in its Riſe is Milky, and this Milky Matter is nothing elſe but theſe Attendants or Scales riſing, and as yet very tender, joined to thoſe Particles which are looſed from the *Superficies* of the *Cryſtalline*, and when the ſaid Milky Matter acquires a greater Conſiſtence, it becomes like curdled Milk, which breaks into diſtinct Parts, and forms the *Cheeſy Cataract*: In theſe two Conditions, the Membrane which covers the *Cryſtalline* is as yet entire and whole.

The *Cataract* is confirm'd and perfect when there is a perfect Change of the *Cryſtalline*: When it gains a greater Solidity than it ſhould have; when the *Attendants* are of a better Conſiſtence when they put more forward, and that the Membrane which covers the *Cryſtalline* is in Part or entirely conſumed, as by a ſort of laudable Suppuration; and when it is ſeen, that over the Apple of the Eye, the *Cataract* is white White, or of another Colour.

There are two Degrees of Perfection, or of Ripeneſs, when the *Attendants* and the Superficies of the *Cryſtalline* are in a certain Degree of Conſiſtence, ſo that they will not ſeparate from the *Cryſtalline*, or diſſolve in the aqueous Humour when they are touched with the Needle, but be looſed from the

ſer adherence to that Membrane; and hen they are ſo pliant and yielding that ey will return again or ſpring back, hen the *Cryſtalline* is convey'd beneath the *Uvea*. The other Degree is of Age, when the *Attendance* are of ſuch a Conſiſtence that ey become fibrous and ſpringy, from hence it happens that the *Cataract* is very ſubject to riſe again in the Operation, and ſometimes that it cannot be freed from the *Uvea*, but with great Pain and Trouble in the Separation.

When, I ſay, that the true *Cataracts* differ by Reaſon of their Size or Extenſion, I mean not that the *Cryſtalline* which is ſo alter'd, ſhould be more extended; but, ſay on the contrary, that it decreaſes in Bulk, I mean that it appears ſo, becauſe that the *Attendants* are in ſuch Quantities ſometimes, and ſo extended, that they take up all the Space which is betwixt the *Cryſtalline* and the *Uvea*, and which paſſes acroſs from the *Pupilla*, as I have ſeen ſometimes, and as ſome Oculiſts have done beſides; it is, without doubt, what ſome Authors have affirmed, that the *Cataract* breeds ſometimes betwixt the *Cornea* and the *Uvea*, when the *Attendants* are ſo, the *Pupilla* cannot contract it ſelf but with Pain, becauſe the *Uvea* is preſs'd by the Scales, and when the *Cataract* is couch'd, and that the *Cryſtalline* remains below, it appears from the *Attendants* almoſt like Clouds thro' the *Foramen* of the *Uvea*, which ſometimes are not intirely diſpers'd. Theſe *Cataracts* uſually form themſelves very readily.

At other times theſe *Attendants* are in ſmall Quantities, that the *Cataracts* appear little, and ſunk in the ſaid Conjunction. The Motion of the *Uvea* is very free, the Paſſage or *Foramen* dilates and contracts it ſelf very readily. They are uſually a long Time in forming themſelves, and run almoſt croſſways, and theſe Traverſes or Bars are nothing elſe but a Part of the Membrane which covers the *Cryſtalline*, which is not totally conſumed by the little Quantity of Humour which produces the *Cataract*: Sometimes it happens that this Membrane is not waſted at all, from whence it comes likewiſe, that theſe *Cataracts* are commonly difficult to ſeparate, but when they are ſo, they eaſily precipitate.

In ſhort, *Cataracts* differ according to their Colours, in that ſome are of a *Sky-colour*, others *White*, which are more common; under which are comprehended theſe ſeveral ſorts, as Snow White, Plaiſter White, Pearl White, Silver White, and other compounded Whites; others are Yellow, others Black, others Brown, Hazel-colour'd, Iron or Cheſnut, others Grey or Aſh colour, and ſome Greeniſh, ſome Authors ſpeak of Red, but I never ſaw any.

A Surgeon, who is an Oculiſt, ought to conſider diligently all the different Colours, becauſe they in a Manner denote all the different Ages of *Cataracts*, and their different Conſiſtences, which gives him great Aſſiſtance in making his Prognoſtick more certain of the good or ill Effects that may ariſe from the ſeveral Operations.

Of the Diagnoſtick *Signs of* Cataracts.

WHen the Humour which occaſions the *Cataract* begins to flow, or gather together betwixt the *Cryſtalline* and the Membrane which covers it; the Patient does not perceive it totally, becauſe it is ſeldom that the ſaid Humour throws it ſelf equally at the ſame Time upon both the Eyes. Therefore when the Phyſician or Surgeon is conſulted thereupon, they ſeldom determine any thing certain, the Signs being equivocal, but content themſelves to direct ſome general Medicines, which may ſtop the Progreſs of the Malady.

Afterwards, when the Patient begins to ſee Things dance in the Air, which appear to him to be like Hairs, Threads, Flies, Wool, Flakes of Snow, or the like, he fancies them immediately to be the Forerunners of a *Cataract*; but theſe Things are not to be depended upon as certain, without at the ſame Time he perceives a ſenſible Diminution of Sight. When theſe Things grow ſtronger and ſtronger without Intermiſſion, that the Sight diminiſhes in ſome degree, and the Patient can ſcarce diſtinguiſh com-

mon Objects without Confuſion, he may be aſſured of the Beginning of a *Cataract*; but he muſt take Care not to confound the Forerunners of the *Cataract*, as the kinds of Conceit or Imaginations, *&c.* with the Diminutions or Errors of Sight, proceeding from a *Cachochymia* Foulneſs of the Stomach, Frenſy, or from Wives or Maids labouring under Vapours or Suffocations, ſince the Miſtake is eaſy to correct by obſerving theſe Symptoms have Intermiſſions, but the others none, but on the contrary continue always the ſame, or grow worſe.

The Encreaſe of the *Cataract* may be known, when you ſee the Colour of the Apple of the Eye chang'd, and begin to perceive white Clouds and the Sight leſſen'd, ſo that the Diſeaſed cannot diſtinguiſh any ſort of common Objects, but only lively Colours, and thoſe very confuſedly when expos'd in the Sun.

In ſhort, one may know a little after the Extenſion of the *Cataract*, whether the *Scales* or *Attendants* are large or ſmall, for if they appear little, ſunk, ſhining and troubleſome to diſtinguiſh the Colour, we may judge 'em of a ſmall Size; but if otherwiſe they appear great, ſhine little, ſuperficial on the Side next the *Pupilla*, ſent forth Filaments, and that the *Pupilla* is more dilated than ordinary, and that it can contract but little, and that very ſlowly, that you obſerve ſome Rays that are unnatural in the *Iris*, and that the other Parts are of a good Colour, you may judge the *Attendants* are very numerous.

Of the Prognoſtick *Signs of the* Cataract.

SInce we know by the foregoing Signs when the *Cataract* is approaching in its State of Maturity, we may judge by thoſe Things, whether we can perform the Operation with good or ill Succeſs. The Patient being placed in the Middle of a Chamber moderately light, and turning one Side to the Window, take notice if the *Pupilla* be well dilated, and if, when the Patient is near the Window or the Door, the *Foramen* or Sight of the Eye contract it ſelf in Proportion to the Patient's approaching the Light.

The Patient being near the Window and the ſound Eye being clos'd, put the Hand before and about the infirm Eye, and obſerve if the *Pupilla* dilate it ſelf as I have ſaid, and then take away the Hand ſuddenly, and ſee if it contract it ſelf not too quick nor too ſlow, and if it return to its former Size.

Or ſhut the ſound Eye, and put the Finger upon the infirm Eye when the Eyelids are down, rub the Eye gently round during ſome ſmall time, then take away your Finger ſuddenly and order the Patient at the ſame Time to open the Eye, and then you will ſee if the *Pupilla* be well dilated, and if it contract it ſelf again as before.

If the Eye is examined theſe Three Ways which have relation one to the other, and the *Pupilla* dilates and contracts it ſelf, as I ſaid, it is a very good Sign for this Reaſon becauſe the Part of the *Uvea* which forms the *Iris*, the *Vitreum*, the *Retina*, and the optick Nerve, undergo no Alteration ſince the Rays of Light which paſs ſome thing feeble acroſs the alter'd *Cryſtalline*, and which are convey'd along the Tunicle, are capable to excite this Senſation, upon account of which the Spirits are engag'd to dilate and contract the *Pupilla* a little check as they can bring it, ſo that the Eye ſhould not ſuffer under the *Cataract*.

In the next Place, the *Scales* or *Attendants* of the *Cataract* are only in a moderate Quantity, and very pliant, ſo that they preſs but lightly upon the *Uvea*, not ſo as to hinder its Motion, but only to give a little Check to it, ſo that we may judge the *Cataract* is ripe, and when it is couch'd will continue firm.

If on the Contrary the *Pupilla* being dilated contracts it ſelf very readily, this Sign there are very few *Scales* or *Attendants* of this *Cataract*, but what are as yet unripeſs'd in the Membrane which covers the *Cryſtalline*, and which remain *Milky* or Cloudy, and conſequently that the *Cataract* is not yet ripe; likewiſe, it is a ſuſpicious Sign of the Succeſs of the Operation, as will

aſon of the Condition of the *Cataract* hich is difficult to divide, as the Danger breaking the Membrane which covers the *ſtalline*, the milky or cheeſy Matter hich diffuſes it ſelf thro' the aqueous umour and ſtops the Sight of the Needle, d the diſtinguiſhing of the *Cataract*, from hence it comes that the Operation is im-rfect.

And if the *Pupilla* being dilated, con-acts it ſelf very ſlowly, it is a Sign that e *Cataract* is old, and that the Scales are ard and ſolid; or if it is new, that the me Attendants are very numerous, ſeeing at they ſqueeze the *Uvea* forcibly, ſo that e *Foramen* cannot contract it ſelf but with ain: This Sign likewiſe is to be ſuſpected at the Operation will not ſucceed, it eing to be fear'd that the Scales ſtick about e *Foramen* or Paſſage of the *Uvea*, which roduces the Trouble in ſeparating the *Ca-ract*; and that when the *Cataract* is ouch'd it cannot raiſe it ſelf again preſent-y, by Reaſon of the Number and Solidity f the ſaid Scales.

If the *Pupilla* is much dilated, and can-ot contract it ſelf, and if it change its figure, theſe are very ill Signs, which de-ote the *Cataracts* either falſe or mix'd, rom whence the Operation is either uſe-eſs, or much to be ſuſpected. If it is con-racted, and after the ſame Manner as be-ore cannot dilate it ſelf or open again, this s likewiſe a very ill Sign, which denotes *Cataract* falſe or mix'd. In ſhort, every *Cataract* when the *Pupilla* is without Mo-ion is very bad, becauſe that declares it to e of an old Date, which renders it wholly opaque, or elſe a falſe one as I have ſaid, or n Obſtruction of the optick Nerve, or ſome ther Diſaffection of the Tunicle, or in the *Vitreum*.

The extream Age of a *Cataract* renders it lmoſt always incurable, becauſe being come to a Maturity, and the Scales having ceaſed to grow, they link themſelves, and ſtick inſenſibly to the neighbouring Parts, and harden in ſuch a Manner, that when it is arriv'd to be very old, either it is diffi-cult to ſeparate it from the Place where it has taken Poſſeſſion without contracting the ſaid Parts, or if it is ſeparated, it is almoſt impoſſible to keep it ſo, becauſe of the Firmneſs or Springyneſs of the Attendants, which ſeldom fail to make the *Cataract* riſe again. It is true ſometimes, but it very rarely happens that we find old *Cataracts* couch'd with Succeſs, but when they have all the good Signs imaginable. As to the Obſtruction of the optick Nerve when it is met with the *Cataract*, the Operation is entirely uſeleſs, becauſe when you have couch'd it the Sight cannot be reſtored, ſince the Paſſages by which the Spirits con-vey the Images impreſs'd upon the Brain are ſtop'd. Another Sign for knowing the Obſtruction of the optick Nerve, is to ask the Patient if he perceives not any Light when he looks upon the Fire or the Sun, or when your Hand or any dark Body is paſs'd betwixt the Light and his Eyes: If he ſees nothing, it is a Sign that there is ſome other Obſtruction than the *Cata-ract*.

The Diſeaſes which change the Diſpoſi-tion of the *Retina* or the *Vitreum*, deſtroy-ing likewiſe the Sight, and making the Operation of no Effect, as I have ſaid be-fore: In examining the good or ill Signs, which make up the different Conditions of the *Pupilla*, we may obſerve at the ſame Time the general Diſpoſition of the Eye, and of every Part, the Colour of the *Cataract*, and the Cauſes that occaſion the ſaid Diſaffections in every one of them.

Likewiſe, if the *Cataract* is unequal in its Colour, it is a Sign to be ſuſpected, becauſe that denotes the Inequality of the Subſtance of the *Attendants* which are not yet ripe; which obliges us to defer the Operation till thoſe Attendants of the *Cataract* have obtain'd a better Conſiſtence.

If it is croſs'd or barr'd, it is likewiſe more ſuſpicious, as being more advanced in Ripeneſs than the former; therefore for the ſame Reaſon we muſt wait a little till it be perfectly ripe, as I have mention'd before, ſpeaking of the *Milky* or *Cheeſy Cataract*.

If the *Cataract* be equally colour'd, it is always a good Sign, and that *Cataract* is reckon'd the beſt by all Practitioners whoſe Colour comes the neareſt the Pearl White, tending

tending a little to a Sky Blue, that Colour denotes a moderate Quantity of Scales, and their due Consistence.

That which is of a greyish White, enclining something to the Ash-Colour, is very good. It has likewise a moderate Quantity of Scales, which are of a pretty strong Consistence, but will yield easier than the former.

That which is White, which inclines something towards a Green, a little like that just going before, which you must take Care not to meddle with, because the Attendants in a little Time become hard, and the Operation is rendered very difficult.

That which is of a white Colour with Black, is hard to couch, and remains fix'd at the Bottom of the *Pupilla*, by Reason of the Multitude of Scales, which are seldom or never to be wholly raised. That which is of a Plaister White is truly false, and entirely deceitful; that which is of a Silver White is commonly so, as well as that which is very clear and shining; and that like a White polish'd, or that resembles a Hail-stone; all which are certainly false *Cataracts*.

Those *Caturacts* which are very Yellow, or very Green, are usually old, and suspected not to answer, tho' I have seen some Yellow ones succeed. Those which are of a Lead-Colour, or very Black, are alike suspicious; but I have seen some few of them couch'd with Success. Those which are of an Iron or Chesnut-Colour succeed sometimes, but they are very difficult to separate, because they stick so close, occasioned by the Quantity of little Scales that either will not readily part, or else they break.

Cataracts happen sometimes to be of a good Colour that are nevertheless to be suspected, and the same are very bad, because they are attended with suspicious Signs; and the same happens on the contrary, that the Colour may be suspected, and yet the Operation succeed, because there are other good Prognosticks which may be convincing that it is safe, which I shall prove by several Observations hereafter.

If the Eye afflicted with a *Cataract* is much less than the sound one, it is a very bad Sign; because the Atrophy or Emaciation is a Token that the Part is destitute of Nutrition: Beside, it will be neither Honour to the Operator, nor Profit to the Patient, to undertake the Operation.

If it is larger than the sound Eye, it is still an ill Sign, because the Abundance of foreign Humours which supply it occasion a Confusion and Destruction of the internal Part, and equally disappoints the Operator as well as the other afore-mentioned. In comparing the disaffected Eye with the sound one, if the natural Colour of the *Iris* is changed for the worse, or the *Iris* is wrinkled or efaced, it is likewise an ill Sign, which shows that the *Cataract* is purulent, corrupted, or a false one, as I have said before.

A difficult Operation may succeed upon a *Cataract* when it is found in a Person whose Eyes are bad, proceeding from extream Pain in the Head or Eyes, and a violent Defluxion upon the Parts. If this same Pain from the Head or the Bottom of the Eye precedes the *Cataract*, and which is said to determine the flowing of the acid Humour into the Centre of the Eye, this *Cataract* is always to be suspected for the Reasons aforesaid.

The Operation is dangerous upon a Person who is constantly Sneezing, has a violent Cough, vomits frequently, or the like, because it is to be feared that the rude Shakes which these Accidents cause hinder the *Cataract* from continuing in its Place after Couching, or else brings some Defluxions on the Eye. Nor is it less dangerous upon Persons who are frequently subject to *Vertigo's* or *Epilepsies*; not only for Fear that a Paroxism may happen in the Time of the Operation, but likewise for the Disorders they produce after the Operation.

Cataracts are very deceitful when they are caused by some Fall, some Stroke, or Prick of the Eye, or other external Causes; whence when these meet together, the internal Parts of the Eye are ordinarily either confounded or destroyed, or mightily altered; and besides, most of the *Cataracts* which arise from such Causes are false. A fine Eye, that is prominent and stands open, is advantageous to make the Operation easy. On the contrary, an Eye that is naturally small and deep in the Socket, renders the Operation more difficult.

by Medicines one may cure a Cataract that is growing, and not yet perfect or confirmed; and if it is to be prevented.

THE Generality of Authors propoſe Medicines for putting a Stop to the *Cataract* in its Formation when begun, or to prevent it before it is confirmed. Theſe Medicines are either General or Particular; by the General, they deſign to ſubtilize and attenuate the Humours, by the Uſe of the *Six Non-Naturals*, and ſeveral other Medicines which are believed to be Specificks. When the Humours are thus prepared, it is proper to purge downwards with other Specificks, among which Aloes is eſteemed the beſt. Then they come to the Uſe of Maſticatories, Sternutatories, Cauteries, and other Remedies to cleanſe the Brain, or diſcharge the Humour which cauſes the *Cataract*. Then they come to particular Medicines, which conſiſt chiefly of *Collyries*, either liquid or dry, prepared from the Galls of Animals, from Gums or Juices, *&c.* But I ſhall not enter here into a Detail of them, ſince I have no Deſign to propoſe any, but only to examine, if by this Method of proceeding, the *Cataracts* may be cured or prevented.

When I conſider that the *Cataract* is an entire Alteration of the *Cryſtalline*, which makes it loſe its Tranſparency; that this Alteration is cauſed by an Humour which I ſuppoſe upon good Grounds to be acid; that this inſinuates it ſelf into the Pores of the Cryſtalline, deſtroys and breaks the radical Moiſture, mixes together the ſoft and gummous Particles which compoſe the Fibres; that it hardens, dries, and changes the natural Diſpoſition of the Bodies, which are thereby out of a Condition of being ſupplied with Nutrition. When I conſider again, that all theſe Things could not happen without the Pores of the Cryſtalline, which give Paſſage to the Light, had been deſtroyed, and conſequently it could not have loſt its Tranſparency, been white, or taken the other Colours I ſpoke of, without ſuch a Change: Now I cannot imagine to my ſelf how a *Cryſtalline* in this State, which is a ſovereign, uſeleſs, and corrupted Body, can be reſtored by theſe Medicines.

Since there is little Proſpect of curing a growing *Cataract*, there ſeems an equal, if not a ſuperior Difficulty to prevent it; becauſe there is no Sign goes before the Defluxion of the Humour, ſo that we cannot judge certainly that the Cataract is forming till the Sight actually decreaſes, and ſome Clouds are begun to be perceived, at which Time it is uſeleſs to make any Application, and there is no Remedy but Patience till the *Cataract* is ripe; ſo that after all the vain Boaſting of many Authors and others, *Promiſſiones itaque omnium horum Pharmacorum magnæ ſunt, verum Effectus aliquando nullus, aliquando valde exiguus*; the Promiſes of all theſe Medicine-mongers are great, but the Effects are ſometimes, nothing at all, and at the beſt meer Trifles.

Of what is to be done before the Operation, the Time to be choſe, and the Nature of the Inſtruments or Needles.

WHen you are aſſured from the Diagnoſtick as well as prognoſtick Signs, that the *Cataract* is ripe, and that it will yield to the Needle, the Surgeon ought in the next Place to conſider the preſent Condition of the Patient. If he finds him to be in a good State of Health, and has no other Infirmity than the *Cataract*, he ought to adviſe him to prepare himſelf directly for the Operation by Conſulting his own Phyſician, or elſe giving Directions for the ſame Purpoſe himſelf. This Preparation conſiſts of a good Regimen or Method of Living ſome Days before the Operation, abſtaining from Wine and groſs or hot Aliments or Diet, which create ill Juices: To render the Bowels free and ſoluble by means of ſome Emollients, to ſweat once or twice, if the Veſſels be full and turgid, and to purge gently at laſt, without heating too much and putting the Humours into a Ferment. For Example: Take two Drams of *Sena*, half a Dram of *Rubarb*, an Ounce of Pulp of *Caſſia*, half a Dram of *Cryſtal Mineral*, infuſe in four or ſix Ounces of the Decoction

coction of *Succory* and *Quick-Graſs*, and in the ſtrain'd Liquor diſſolve an Ounce of *Manna*, and another of Syrup of *Peach-flowers*; or if the Patient is of a nice and delicate Conſtitution, give only an Ounce of *Caſſia*, an Ounce and half of *Manna*, and an Ounce of Syrup of *Succory*, mix'd together and put into two Vials, to be taken three Hours one after the other. The Intention of this Method is to prevent a Defluxion or Inflammation that may ſucceed the Operation, likewiſe to take off from the Plenitude of the Blood and Humours, to leſſen the Quantity of Excrements, or to ſtop by a regular Diet the Encreaſe of the Blood, and prevent or remove the *Cachochimia*.

As to the Time of the Operation, let it be done in Spring or Autumn, in which Seaſons chuſe the Months of *May* and *September*, which are beſt: But when the Patient will not or cannot ſtay, or that the Nature of the *Cataract* is ſuch, that it is harden'd, and that you apprehend by ſtaying that the *Attendants* will grow worſe; avoid only the extream Heats and Colds as Enemies both to Wounds of the Eyes; and when you begin, chuſe ſettled Weather, eſpecially take that the Day of the Operation be clear and ſerene, that you may ſee the better to perform the Work.

Before the Operation, it will be neceſſary to take Care that the *Needles* be in a good Condition; that they be of a moderate Bigneſs, about the Size of thoſe *Needles* that are uſed for common Linnen: The large ones make too great a Diſcharge, and conſequently give a great deal of Pain, and the ſmaller Sort are not ſtrong enough to penetrate the *Cornea* without bending or giving way, and are not ſo convenient for *Couching*. They ought to be neatly polliſh'd to ſlide the eaſier, and finely pointed to pierce the Part with leſs Pain, a little Edg'd and Cutting on each Side near the Point, much like the ſtraight Needles for ſewing up of Wounds that they may enter the eaſier, and ſurmount whatever Oppoſition they ſhall meet with in the Operation. Some *Oculiſts* uſe round Needles, becauſe, ſay they, the double-edged ones cut the Fibres which paſs thro' or penetrate, which is true, but the round ones bruiſe more Fibres which they divide, and the F being wounded, heal with more D culty.

The Way of Couching a Cataract

THE Patient being prepared, and Day of the Operation come, the geon or Operator ought to attend on about eight, nine or ten a Clock in Morning; or about three, four or fi the Afternoon, if the Morning be dar rainy: Let him viſit the Apartments of Houſe to chuſe a Chamber with a Light, wherein the Sun ſhines not, be the Rays ſtriking too forcibly on the fected Eye, contracts the *Pupilla*, and wiſe incommodes the Patient when the *taract* is diſcharg'd.

There ought to be two Seats prepared for the Patient, which is to be placed ſite to the Windows at a convenient ſtance and a little aſlope, ſo that the ſtrike not directly upon the Face of Sick ſo as to render the Eye too L and hindring the true Diſtinction of *Cataract* and the Needle when in the the other Seat for himſelf, which ou be a little higher in Proportion to the neſs of the Patient or that of the Sur becauſe he ought always to be placed than the Patient to work the eaſier.

The Seats being prepared, when come to the Patient, it may not be per to apply a Compreſs of ſeveral D upon the ſound or well Eye, which be ſupported with a Bandage placed liquely, and that for two Reaſons; the to hinder the Eye from moving eith wards the Aſſiſtants or other adjacent jects, which might engage the diſa Eye to move at the ſame Time; in the Place, to ſtop the *Pupilla* from contra ſelf, if the Patient turns the Eye to the Light, the ſame will happen to the *pilla* of the diſaffected Eye: Becauſe Motions which are made in one E likewiſe perform'd the ſame in the oth

Having made the Patient ſit do Servant muſt ſtand behind, and wi his Hands plac'd on both Sides the

ead, hold it backwards, while the Surgeon
ting upon his Seat oppoſite to the Patient,
ks him to hold his Hands down upon his
nees, and coming nearer to him, ſits
wn upon his Knees and his Thighs. He asks
m likewiſe to hold his Eye open, and to
rn it as he would have it, and then com-
ands him to hold his Eye ſtill in the ſame
tuation: Afterwards he puts the fore Fin-
r of the right Hand, if he perform the
peration on the right Eye, on that Part
hich is underneath the Eyebrow, and the
humb upon the Prominency of the Cheek
divide it, holding the Eyelids at the
ne Time open: And then obſerving the
ace which he would prick, which is
e White of the Eye on the Side of the lit-
Corner, within two Thirds almoſt of
e outward Circle of the *Iris*, or a little
arer, or elſe ſomething further off, ac-
rding to the Size of the Eye, and juſt up-
a direct Line that he can fancy to be
awn from one Corner to the other, taking
are to avoid whatever Veſſels may appear.
Let him pitch upon the Place whereby he
ay avoid touching on that Part where the
vea joins it ſelf to the *Cornea*, by means of
e Ciliary Circle: Becauſe, if it be prick'd
that Circle, it will no doubt produce a
lious Operation, to ſeparate from that
le the *Uvea* from the *Cornea*; and if that
paration prove conſiderable, the *Iris* will
ſunk in, and the *Pupilla* dilate and con-
ct it ſelf irregularly, and the Inſertion of
e moving Fibres no longer remain in that
ace: So that the Operation muſt be al-
ys unſucceſsful as well as tedious, if
e Operator refuſe to chuſe that Place to
ke his Puncture, in which I have obſerved
him, as well for the Reaſon aforeſaid,
that the Point of the Needle may be mo-
d with greater Freedom, and in a much
ger Extenſion.

The Place being choſe, the Surgeon with
s left Hand if it be the right Eye upon
hich he works, and the right Hand if it
the left Eye, muſt take his Needle from
s Servant or Attendant, and hold it ex-
tly as a Pen is held in the Hand to write
th, reſting upon the little Finger and
ng Finger all the Time to hinder the
nd from ſhaking, and then let him prick
ldly in the Place deſign'd, the Mem-
branes which compoſe the White of the Eye, the *Cornea* and the *Uvea*: When he has penetrated the *Uvea*, he muſt lean a little the Handle of his Needle gently to the Side of the Temple and the Thumb, and turning it juſt that way a-croſs from the tranſparent *Cornea*, the Point muſt be brought within two Thirds of the *Pupilla*, then it muſt be rais'd and couch'd, to ſee if the Scales do not ſtick to the Side of the *Pupilla*; which will be known, when the *Iris* appears to move, and the *Pupilla* changes the Figure according as the Needle is moved; and if by theſe Motions it ſeparates gently by little and little: If not, convey the Point of the Needle towards the upper Part of the *Cataract* or *Cryſtalline* that is chang'd, and in bearing a little towards the Centre of the Eye, it will be couch'd, repeating it again juſt to that where the *Cataract* ſeparates it ſelf from the Place which it poſſeſſes. When it reaches entirely the upper Part, and is gently ſupported, it is perfectly couch'd at the Bottom or beneath the *Pupilla*, where it gains a Place betwixt the *Vitreum* and the *Uvea*, the Ciliary Circle dividing it ſelf after the ſame Manner in that Place from the Membrane of the *Vitreum*.

The Surgeon taking the *Cataract* in that State during ſome Part or a little of the Time, and raiſing afterwards the Point of his Needle if the *Cataract* remains *couch'd*, the Operation is happily perform'd; if it riſe again and makes a Spring, it muſt be *couch'd* again ſomething more than the firſt Time, raiſing ſtill more the Point of the Needle, and if the *Cataract* riſe again, it muſt be couch'd as before; during all the Time, if the Surgeons Arm be tired, it ought to be ſupported by a Servant to prevent the Shaking of it.

The *Cataract* being left at the Bottom of the *Pupilla*, the Surgeon withdraws his Needle gently in the ſame Manner as he introduc'd it; nor is it neceſſary that the Patient ſhould have any Objects offer'd him preſently to diſtinguiſh, the Surgeon knowing ſufficiently by the Blackneſs and Clearneſs of the Apple of the Eye: But on the Contrary, the Patient ought to be deſired not to ſpeak at all, and to regard no kind of Objects, becauſe that may give Occaſion

to the Motion of the Eye, and put the Surgeon in Fear, leſt when the Needle is in the Eye, there ſhould be produc'd ſome falſe Motion, which might be of ill Conſequence.

The Operation being made, a Compreſs of ſeveral Doubles is to be applied over both the Eyes, firſt ſteep'd in a Colliry made with Roſe-water, Plantain-water, and the White of an Egg beat together, and if the Patient has any Averſion againſt Roſe-water by Reaſon of its ſweet Scent, which ſome Perſons cannot abide, as Women and young Girls, then make it only with Plantain-water and the White of an Egg: Bind afterwards the diſaffected Eye, and likewiſe the ſound One for the Reaſons aforeſaid. Let the Patient be laid in Bed upon his Back, with his Head a little rais'd, and deſire him to repoſe himſelf, and not give himſelf the Liberty to talk.

How to overcome the Difficulties which may happen during the Operation.

THE firſt Difficulty which happens, is when the Patient is ſo fearful and concern'd that he cannot hold his Eye ſtill, and that has ſo little Reſolution, that when he perceives the Point of the Needle, he turns his Eye upwards or downwards, or elſe ſideways; upon ſuch an Occaſion it is neceſſary to exhort him to have more Reſolution, and to engage him to turn his Eye towards the Noſe, and during that Time endeavour to ſurpriſe him by ſtriking at once into the Place deſign'd: When the Membranes are pierced, you are then Maſter of the Eye, and may finiſh the Operation as before taught.

But it happens ſo ſometimes, that in Pricking, the Puncture is made either a little too high, or a little too low for the Place deſign'd, by Reaſon of the Unſteadineſs of the Eye: It is true, this occaſions a little more Difficulty, for when one pricks below, there is more Trouble to reach the upper Part of the *Cataract*, but it is then eaſy to lodge at the under Part of the *Pupilla*, and when one pricks high, it is much eaſier to reach the *Cataract* above, and more difficult to govern it at the lower Part.

The ſecond Difficulty proceeds from Milky Cataracts.

THIS is when one is deceived with the Age of the *Cataract*, for it happens ſometimes in *Cataracts*, that they appear confirm'd and ripe, and which nevertheleſs are Milky ſtill; which young People are frequently ſubject to: And as this Milky Matter is continued underneath from the Membrane which covers the *Cryſtalline*, and which ſometimes is in ſuch large Quantities that it forms an Humour, ſo that it happens often in paſſing the Needle thro' in order to make the Matter move forward underneath the *Pupilla*; when that Membrane is prick'd, the Milky Matter ſpreads it ſelf and mixes with the aqueous Humour, rendring the whole white, and fruſtrating the Operation of the Needle. In ſuch a Mixture, if the Membrane which covers the *Cryſtalline* be well taken off, the Operation ſucceeds, becauſe the *Cryſtalline* falls, not being any longer ſuſtain'd by the Membrane. When this happens, the Operator muſt endeavour to hold up his Needle in order to make his Lodgment ſecure at the Bottom of the *Pupilla:* But if the Membrane is not well taken off, or that which is on the upper Part, the *Cryſtalline* cannot precipitate, and it is very difficult to finiſh the Operation.

Nevertheleſs, as one knows the Situation of theſe Bodies, the Needle muſt be gently held up towards the upper Part and couch'd afterwards, repeating the ſame Motion two or three Times with Caution, then withdrawing the Needle for fear of deſtroying ſome internal Part, or leſt he ſhould enter the Superficies of the *Vitreum*, in caſe that the *Cryſtalline* was precipitated.

The third Difficulty ariſes from the Clouds *Cataracts*, which likewiſe deceive us as their Age; and when the Needle is in the Eye, ſo that one ſees the Scales or Attendants of the *Cataract* are yet tender, ſeparating themſelves from the *Cryſtalline*, and floating in the aqueous Humour: Upon

is Occaſion, it is much better to couch e *Cataract*, which at that Time is Milky, ecauſe then the aqueous Humour does not iſturb it ſo much, and commonly the embrane which covers the *Cryſtalline* is ther deſtroyed, or at leaſt ready to ſepate: But likewiſe, it is not certain that all e Scales that are ſeparated do entirely recipitate, and that ſome of 'em do not main at the Paſſage of the *Pupilla*, which ncommode oftentimes as much as the *Caract*.

Here we muſt act with Caution, and as on as the Scales are perceived to part, to rry the Point of the Needle towards the pper Part and the Middle of the *Cryſtalline*, nd in bearing upon the Bodies and couchg, endeavour to precipitate them at the ſt Stroke, to the end that the Scales may vide leſs: If this ſucceed not, repeat the peration; and when you ſee the *Cryſtalline* recipitate it ſelf, ſo that you can know by e Size of the Bodies, how conſiderable the ales are which remain at the Bottom of e *Pupilla*; afterwards, with the Point of e Needle couch the largeſt Pieces of thoſe ttendants as much as you can, but leave e leſs behind that float in the aqueous umour, till they precipitate themſelves, being better not to couch them, becauſe e Needle cannot take hold of them.

When all theſe ſmall Parts of the Scales ve precipitated themſelves, the aqueous umour re-aſſumes its uſual Tranſparency, nd the diſaffected Parts recover their Sight: ut when ſome of them remain, or riſe ain from thoſe that have been couch'd, as metimes it happens, for it is ſeldom that riſes by the *Cryſtalline*, there appears a loud on the other Side of the *Pupilla*, hich is thought ſometimes to be the ſame *taract*: It is however, eaſy to know, that is nothing but the Attendants or Scales the Inequality or Unevenneſs of the loud, which in ſome Places is fine and anſparent, and in others more compact d obſcure; from whence it comes, that metimes the Patient ſees as if it was thro' Sive when the Pieces are numerous, at her Times, as if thro' a little Hole, when ere is found to be a Break in the Middle; metimes likewiſe he ſees nothing but a great Light, when there is a large Piece which covers the Middle of the *Pupilla*.

The Fourth Difficulty proceeds from the Number of the Scales: But when theſe are very pliant and yielding, and in a moderate Quantity, it is then one of thoſe ſort of *Cataracts* which are in a Degree of Ripeneſs, ſo right and kindly, that they precipitate with the leaſt Touch of the Needle, and without any other Difficulty, than by gently preſſing upon them with the Point of the Needle, to help to lodge them at the Bottom of the *Pupilla*: But when the Scales are numerous, they cauſe abundance of Difficulty, notwithſtanding the ſame be very pliant and yielding.

When you perceive by the Prognoſtick Signs, that the Scales are numerous, you muſt take Care to introduce your Needle ſo, as not to engage it in any thing but the Scales, and for that End in penetrating the Membranes of the Eye, you muſt bend the Handle more towards the Side of the Temples, in order to conduct the Point of the Needle nearer to the inward Part of the *Iris*, all that Time taking Care leſt the *Iris* ſhould be prick'd underneath: And the Point of the Needle being brought commonly within two Thirds of the *Pupilla*, you muſt act as I have directed before.

Theſe *Cataracts* are ſubject to riſe again after the Operation, by Reaſon of the Multiplicity of the Scales, which conſiderably encreaſe their Bulk, and which make them ſo ſlippery, that with leſs Force they are puſh'd back oppoſite to the *Pupilla*. This obliges us to return the Needle a ſecond Time into the Eye, four, five or ſix Days after the Operation, the Inflammation not being conſiderable.

They are not always the *Cataracts* which riſe again, they are ſometimes the Scales which appear by the *Pupilla*, when they are much extended or ſpread about, which are known when they are ſeen floating, or when they appear like Clouds of a different Conſiſtence; they cover ſometimes a little Part of the Apple of the Eye, then it is clouded but very ſmall, at other ſometimes it covers it more, and then looks dark: Commonly it decreaſes and diſappears in the Attendants; ſometimes alſo it remains

in the ſame Condition, and we are oblig'd to touch again, as may be ſeen before.

The greateſt Difficulty which is to be met with in the Operation of couching *Cataracts*, is when their Scales are ſolid: This Solidity of theirs gives a kind of Spring to the Parts that makes the *Cryſtalline* ſometimes mount up ſo high, that it cannot be conquer'd by the Needle; and beſides, we find theſe ſort of *Cataracts* fixed.

In Couching of theſe, obſerve only that you free it well all round the *Pupilla*, and if it clings to, it muſt be done gently, by little and little, ſo that you tear not or dilate the *Pupilla*, that when the Needle preſſes above, one may ſee the *Iris* follow the Motion of the Needle, and the *Pupilla* change its Figure. Upon theſe Occaſions we are forced to repeat the Operation again and again, theſe *Cataracts* being ſubject to riſe entirely again; ſo that ſometimes I have couch'd to the third and fourth Time, without any ill Accident attending it, and ſometimes done it by the very ſame Orifice: When Scales of this Nature cannot be met withal but in moderate Quantities, the *Cataracts* ſucceed well, but otherwiſe with great difficulty.

Of ſeveral Accidents that attend the Operation of the *Cataract*: It happens ſometimes, that after having penetrated the *Cornea*, the Needle touches upon ſome of the Springs of the Nerves, when the Patient is affected with a ſenſible Pain. As it is impoſſible to avoid ſuch Conſequences, we muſt only take Care in the Motions of the Needle, to perform 'em conſiderately and ſlow, and not precipitately and in haſt. Other ſometimes we break ſome of the Branches of the Veins or Arteries, ſo that there is an Extravation of the Blood in the Eye, which paſſes ſometimes betwixt the *Iris* and the *Cornea*, and precipitates it ſelf below; ſometimes likewiſe it conſiderably diſturbs the aqueous Humour, when we find the Operation tedious.

During the Time of the Operation, there is almoſt always ſome Effuſion of the aqueous Humour by the Orifice which the Needle makes: When this is little or moderate, there happens no change at all to the Eye; but when it is conſiderable, the *Cornea* ſinks, the *Iris* is wrinkled, and the Patient has Trouble in diſtinguiſhing Objects, tho' the *Cataract* be well couch'd, which ſurpriſes young Beginners, who ought not to be frighted, becauſe this Humour will breed again very ſpeedily, and the Sight be reſtored. But to make the Operation more ſucceſsful and happy, Care muſt be taken not to ſqueeze the Ball of the Eye during the Time, which will be a Means to hinder its Motion; beſides, ſuch a Preſſure forces out the aqueous Humour; upon which account, ſome uſe the *Speculum Oculi*, and ſome Authors adviſe it, but I would have you be ſatisfied in holding the Eyelids open, as I have taught already. Likewiſe you ought to take Care in piercing the Ball, that it be done almoſt perpendicularly and not ſlanting, to the end that the Puncture be no larger than the Size of the Needle, particularly when the Needles are little Edged towards the Point; as for the round ones, we are not under the ſame Apprehenſions. There are ſtill remaining other Difficulties to be met withal in Operations of this kind, which I ſhall not mention here, becauſe they depend not on the different Conditions of true or real *Cataracts*, but of mix'd or falſe ones, which I ſhall handle directly.

Several practical Obſervations of what has been already deliver'd, and firſt of a Milky Cataract.

THE 17th of *October* 1685, I went to *Sezanne* to couch a *Cataract* in the left Eye of a young Fellow, call'd *Nicholas Very*, Servant to *Sebaſtian Contan*, Labourer. This *Cataract* appear'd to me to be of a good Colour, the *Pupilla* dilated it ſelf ſlowly, but very well, and contracted it ſelf alſo in the ſame Manner; when I put my Hand betwixt the Light and his Eye, the ſound Eye being ſhut, the Patient cou'd diſtinguiſh nothing but the Shadow of the Object, and a faint Light. Theſe Signs made me judge that the *Cataract* was ripe, and ſo much the more, that afterwards he could not diſtinguiſh at all, as he told me. I was, notwithſtanding this, deceiv'd, for in introducing the Needle into the Eye, I perceived preſently that the aqueous

our began to whiten, then I advanc'd my Needle to about two Thirds of the *Pupilla*, d ſaw a little, becauſe the aqueous Hu-our was not as yet ſufficiently diſturb'd; d as I have been ſatisfied that the *Cataract* as nothing elſe than a total Alteration of e *Cryſtalline*; I deſpair'd not at all of per-rming the Operation: I convey'd then e Point of my Knife towards the upper Part of the *Cryſtalline*, and couch'd it after-ards gently, and during that Time the ueous Humour whiten'd more; I con-y'd my Needle in a ſecond Time as be-re, and in couching, the Patient told me he ſaw the Light, which made me judge at the *Cryſtalline* had precipitated it ſelf; in ſhort, that the aqueous Humour was ry Muddy, the Apple of the Eye appear-d not to be ſo white, and I ſaw that it ontracted it ſelf pretty much, ſo that I as convinced the *Cryſtalline* was entirely recipitated: A little while after I with-rew my Needle, and judged the Patient well as ever. Some Days after I re-rn'd to ſee him, and found that the aque-us Humour was very clear, and that he diſtinguiſh'd all ſorts of Objects: I ſaw im again ſeven or eight Days afterwards paſſing thro' the Village, and found the Operation had totally cured him.

The ſecond Obſervation upon a Milky Cataract.

THE 20th of *October* 1691, having couch'd a *Cataract*, which ſucceeded as well as could be deſired, with all the good Signs imaginable: The left Eye at the ſame Time was affected with another *Cataract*, which appeared to be ripe, but I put off the Operation till the beginning of *October*, in the Year following, when the *Cataract* look'd well and ripe, I then ſet the Patient a Day for the Work. When my Needle was in the Eye, and that I endeavour'd to couch the *Cataract*, I perceiv'd that by preſ-ing above, it ſunk to the Bottom, and look'd as if it was floating in the aqueous Humour; I made ſeveral attempts to raiſe my thing, becauſe my Needle would ſlide upwards, I then determined to withdraw it a little, to convey the Point towards the Middle of the *Cataract*, and in preſſing up-on it, I broke the Membrane which co-vers the *Cryſtalline*, and preſently a Milky Matter flow'd out, which made the aqueous Humour ſeem like Water in which Soap had been diſſolv'd: In declining or bearing down the Point of my Needle, I perceived the *Cryſtalline* like a large Pea which was drop'd down, I carried the Needle upwards to lodge it at the Bottom of the *Pupilla*, or leave it there. As I was drawing back my Needle, the Earneſtneſs the Patient had to anſwer one of his Neighbours, who asked him if he could ſee, made him turn his Eye haſtily outwards to take Notice of him, ſo that the Point of my Needle ſtruck upon the Side or Edge of the *Pupilla*, and tore it off: Some Days afterwards the Eye clear'd up, and the Patient was perfectly cured: The *Pupilla* remained a little dilated; nevertheleſs, he ſaw of that Eye ſuch Objects as were near as well as of the other Eye, but Things at a Diſtance appeared ſomething confus'd.

The Third Obſervation upon a Cheeſy Cataract.

IN the Year 1689, the 14th of *May*, I perform'd an Operation upon one *Claudius Roberts*. When my Needle was thruſt into the Eye, the *Cataract* appear'd to me to divide it ſelf into ſeveral Pieces, I convey'd the Point of the Needle towards the upper Part, and the Middle of the *Cryſtalline*, which I couch'd at the firſt Stroke, afterwards I endeavour'd to couch ſome of the largeſt Pieces, and had a great deal of Trouble in couching one that ſeem'd to be the Biggeſt, and in fixing ſeveral others, upon which my Needle would not take hold, and which appear'd to float about, I ſtopp'd my Hand and withdrew the Needle, hoping that thoſe Pieces would precipitate in the End. During the Operation, the aqueous Humour was jumbled together; but 8 or 10 Days after, returning to *Sezan* where I couch'd this *Cataract*, I found that this Humour was grown clear, that the leſs were precipitated, and that there remain'd one behind, which poſſeſs'd the Middle and almoſt two Thirds of the *Pupilla*,

Pupilla, in the Nature of a Cloud, much the Thickeſt in the Middle, ſo that the Patient could ſee nothing but a great Light, without being able to diſtinguiſh the Form of the Objects, but only their Colours, as Whites, Reds, Greens, *&c.* This Cloud ſeem'd to give Way when the Patient moved his Eye, which made me believe that it was totally precipitated: So that not being to viſit him till four Months after the Operation, when I came to ſee the Patient, who ask'd me to walk down from his Chamber to go into the Street, he was ſurpris'd, being then in the Entry of the Houſe, to ſee and know Paſſengers as they went by. And ſometime after, he return'd to his Trade, which was a Cooper, and work'd conſtantly at it with that Eye only, having loſt the other by ſome other Diſeaſe.

The Fourth Obſervation upon two Cataracts *with numerous* Attendants, *or a Multiplicity of Scales.*

ON the 26th of *Auguſt* 1698, I couch'd two *Cataracts* of a Paſtry-Cook's in *Sezan*. I judg'd by the Signs as aforeſaid, that the two *Cataracts* had numerous Scales, yet the one was younger than the other, that of the Right Eye being a little more confirm'd than that of the Left. I began with that of the right Eye, and when I had introduced my Needle, I had a great deal of Trouble to make the Matter quit the Place to which it was fix'd, and when it was ſeparated, I had ſtill more Trouble to fix it at the Bottom of the *Pupilla*, by Reaſon of the Multitude of Attendants that clung about my Needle, notwithſtanding which, I perform'd it: But as I was going to forbear, a ſlight Weakneſs or Fainting overcame the Patient, and apprehending he would fall into a *Syncope*, I drew out my Needle, and when he was recover'd from his Faintneſs, I examin'd his Eye, and ſaw that the *Cataract* was couch'd, and that there appear'd only a few Scales towards the Bottom of the *Pupilla*. I laboured afterwards at that of the left Eye, which gave me not ſo much Trouble to couch, but it riſe ſeveral times, and at laſt ſtay'd eight Days; after, I return'd to ſee him, and I found that the two *Cataracts* were riſe in ſome Meaſure, by Reaſon that almoſt two Thirds of each *Pupilla* were cover'd over by the Scales, and the Patient could not but with great Difficulty diſtinguiſh any Objects. That did not happen till the 5th Day after the Operation, and he told me, that Monſieur *Houllier*, his own Surgeon, attributed the Cauſe of it to the Impatience and Anger the Patient was in the Day the Operations were perform'd. I did not find it proper to couch again haſtily, becauſe I ſaw leſs Diſturbance and Motion in the Eye, that the Patient ſaw ſometimes pretty well during ſome ſhort time, and that other ſometimes both remained couch'd or precipitated for four or five Days, ſo that I believed they did not ſtick in the Place where they appear'd, ſo that I hoped when theſe Scales were dried, ſhrivelled up and conſumed, they would ſink immediately, which happened exactly ſo in five Month Time or thereabouts after the Operation, tho' they precipitated all that Time but by little and little.

The Fifth Obſervation upon two Cataracts *with hard Scales.*

IN *June* 1694, one Madam *Germain*, a Lady ſomething in Years, came to me to couch her of two *Cataracts*, one was older and a little yellow, the other much younger, whiter and better; I perform'd the Operation on the 30th of the ſaid Month, and undertaking it out of Hand as the beſt Way, I found the *Cataract* adhering to the Circumference of the *Pupilla*: When I had ſeparated the Fibres which cauſed that Adherence, I couch'd the *Cataract* with ſome Difficulty, and convey'd it at the Bottom of the *Pupilla*: But that ought not to be done too often, leſt it eſcape under the Needle and riſe again, which happens ſometimes, and is very likely if you preſs not equally, for ſometimes it is before my Needle, and other ſometimes behind, but eſcapes only when I draw back the Point of my Needle behind, or advance it forward. In ſhort, I bore upon the *Cataract* ſo exactly during the Time of Operation, and then

moved my Needle, and the *Cataract* remain'd couched. Afterwards I couch'd the other with the ſame Trouble; three Days after which, this laſt riſes again entirely, I couch'd it inſtantly, and paſs'd my Needle thro' the ſame Orifice, which was done without Pain. The ſeventh of *July* following, I found that the firſt I had couch'd was likewiſe riſe again: I return'd the ſame Day my Needle into that Eye and couch'd it; but I pierced the Eye in another Place, becauſe the Orifice of the firſt Puncture was covered with a little Speck of Fleſh, and returning ſome Days afterwards, they were cured.

The Sixth Obſervation upon an Operation ſucceeded with a conſiderable Extravaſation of the aqueous Humour; this Cataract *being of the Nature of thoſe ſpoke of in the 4th Obſervation.*

THE Wife of one *Roger Marinot* of St. *Bennet's*, being afflicted with two *Cataracts*, the one Confirm'd or Ripe, and the other Young and Riſing: I work'd upon the firſt, which was the right Eye, the 21ſt of *April* 1698. I found the Scales very numerous, but pliant. As I had almoſt couch'd the Eye, I know not upon what Occaſion, but the Woman turn'd her Head a little to the left Side, ſo that ſhe thruſt out my Needle from her Eye. Being embaraſs'd with this Accident, I would have return'd the Needle by the ſame Orifice, but the Woman had no Patience to permit me. I reſolv'd then to make a Puncture in another Place, and preſſing upon the Part in order to introduce my Needle, the aqueous Humour iſſued out thro' the firſt Orifice, which kept running conſtantly during the Remainder of the Operation, and when that was done, it was ſo conſiderable, that after I had withdrawn my Needle, the tranſparent *Cornea* appeared to me ſunk, and the *Iris* very much wrinkled. I was not ſurpriſed, having ſeen at other times almoſt as great Diſcharges. The 29th of the ſame Month I went to ſee her, and found the Ball of the Eye as full as it was before the Operation, but the *Cataract* was almoſt totally riſen again. I pierced the Eye once more by a new Puncture, and couch'd it preſently, after which it reſted there, and this Woman was without any Danger, notwithſtanding the three times pricking of the Eye, which ſhe underwent; the 24th of *May* in the ſucceeding Year, I couch'd her other *Cataract* more ſucceſsfully than the Firſt, and without that Trouble: I ſhall not take Notice of any Obſervations made upon the Extravaſation of Blood, which ſometimes happens upon the Part during the Operation, nor of the exquiſite Pain which the Patient undergoes ſometimes, when the Needle meets with the little Sprigs of the Nerves which glide betwixt the *Cornea* and the *Uvea*: Notwithſtanding I have ſeen theſe Things often happen, becauſe I ſeldom or ever ſaw any ill Conſequences from thence, as I have obſerved before.

The Seventh Obſervation upon a Black Cataract.

THE 24th of *September* 1698, I went to *Vannes* near St. *Bennet's*, to couch two *Cataracts*; that of the left Eye was a white one, ſomething greyiſh and ripe, the *Pupilla* dilated and contracted it ſelf ſlowly, and could diſtinguiſh the Shadow of the Objects that paſs'd betwixt the Eye and the Light. That of the right Eye was black, and it had very little Motion from the *Pupilla*, and conſequently very ſuſpicious. I begun with the left Eye, where I found the Scales numerous, but pliable, and fix'd at the Bottom of the *Pupilla*. The Operation being done, and the Patient dreſs'd, I perſwaded him to lie down, not thinking it proper to work upon the right Eye. The poor Man ſeeing that, deſired me inſtantly to try to give him Sight likewiſe of that, joining Tears to his Prayers, as his Wife did the ſame: But I would not conſent to undertake an Operation which I believed deſperate. I told my Reaſons to Monſieur *Poullier*, Surgeon in Ordinary to the King, who was preſent, to the

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end that he might diſſwade the Patient from it; which ſignified nothing, his Affliction encreaſed, and he would have me perform it: I thruſt the Needle into the Eye, and found the Scales ſolid and few in Quantity, which divided themſelves the one from the other, as being ſpringy and fibrous: I divided the *Cataract* the beſt I cou'd, and ſtrove to couch it; but when I thruſt the Needle into the upper Part, and preſs'd hard below, it eſcap'd me: I made many Attempts in vain, it return'd always into the ſame Place, and ſeeing that I could not raiſe it, and that the aqueous Humour began to grow muddy by Reaſon of ſome Blood which flow'd from within, I drew out my Needle and dreſs'd the Patient.

The laſt Day of the Month I went to ſee him, but was happily ſurpris'd to find this ill *Cataract* precipitated the better Part of two Thirds, and the Patient diſtinguiſhing with that Eye all kinds of Objects, which gave me hopes that it would entirely precipitate. That of the left Eye, on the contrary, was a little riſen, but it precipitated it ſelf afterwards. Twelve or fiveteen Days being gone, I went to him, and found the black *Cataract* totally precipitated, ſo that he could ſee better of that Eye than of the other, which had the white *Cataract* upon it.

What is to be done after the Operation; and the Methods of remedying thoſe Accidents which may attend it.

THE Patient being dreſs'd, in the next Place we come to the *Regimen*, Method of Government or Rule for his Living, which is to conſiſt chiefly of boil'd Meats, Broth, or Panado and new-laid Eggs, abſtaining from Wine, inſtead of which, let him drink common *Ptiſan.* Six or ſeven Days after the Operation, if no Accident happens, he may be permitted to eat haſh'd Meat, or any other Kind that is eaſy of Digeſtion, and to drink Beer and Wine mix'd.

The Night after the Operation, you may take away the Compreſs above the Eye, and apply another ſteeped in the ſame Colliry as that was, and ſo continue to do the next Night and Morning if it is too Dry. Three or four Days after open the Patient's Eye, to ſee if the *Cataract* has not chang'd its Place, or if the Inflammation is not too great. Take Care in opening the Eye, that the Light be not too ſtrong, for fear of encreaſing the Pain, which in that Condition it ſuffers from the Light. If you would be aſſured that all goes well, continue to dreſs the Patient, till ſuch time as the Defluxion and the Inflammation are gone, which is commonly ſeven Days. Uſually the Prick of the Needle is found in a manner cured in that Time without any other Application: Nevertheleſs, if it is not entirely well by that Time, you may uſe a Colliry made with five Grains of *Rhaſis's white Troches*, diſſolv'd in an Ounce or two of Roſe or Plantain-Water, pouring a few Drops of this into the Eye five or ſix Times a Day to heal and skin the Wound, continuing to apply a Compreſs as before, till the Cure is finiſh'd.

The Time of the Defluxion and the Inflammation being over; if there is ſuppoſed to be a Weakneſs of the Eye, which is known by the tearing of a ſerous Humour without Pain or Inflammation, or when there is a Flux of the aqueous Humour in the Time of Operation, then ceaſe to uſe the cooling Colliry, but rather apply a moderately warm and drying one, made with *Fennel* and *Eyebright* Water, mix'd together with a little Spirit of Wine, in which ſteep the Compreſs, and apply it hot to the Eye, renewing it every now and then: Or make ſuch a Liquor with a Handful of Aniſeed or Fennel infus'd in White-Wine or Claret.

The moſt common Symptoms that follow the Operation are the Defluxion, the Inflammation and the Pain. When the Symptoms are ſlight, they are to be corrected by the cooling Colliries often repeated, adding ſometimes Night-Shade Water to make them more cooling. But when they are violent, there ought to be uſed Remedies which have Strength to hinder the Progreſs of the Defluxion, as Bleeding in the Arm on the diſaffected Side, and

the Jugular on the ſame Side if the Defluxion is extraordinary. Likewiſe, Leeches may be applied to the Temples, and Bliſters behind the Ears. Experience ſhews us, that theſe general Remedies contribute conſiderably towards the Stopping of Defluxions in the Eyes, in leſſening the Quantity of the Fluids, and revulſing the Humours which are the Cauſes thereof. When the Defluxion is ſtop'd, the Inflammation and the Pain ceaſe afterwards of Courſe, and then the ſoft cooling Collíries are of the greateſt Uſe; as diſtill'd Waters of *Melilot*, *Lilly* and *Roſes*, with a little Linſeed or Quince, to render it more mucilaginous, and half a Scruple of *Saffron* to four Ounces of the Water; this ſtrain'd, and drop'd a few Drops ten or twelve Times a Day into the Eye, gives great Relief: Likewiſe hold a Compreſs upon the Eye ſome time together, that has been ſteeped in this Water.

For the ſame Intention, Pidgeons Blood is uſed to be drop'd hot into the Eye, or elſe Breaſt-Milk in which a little Saffron is infuſed, tho' ſome modern Authors condemn this Milk in Diſeaſes of the Eyes, as being ſubject to curdle; but Experience teaches us to the Contrary, that nothing is more uſeful in Wounds of thoſe Parts, when attended with Pain. In ſhort, its ſoft balſamick Parts ſweetens the acid Humours, allays the Pain, and diſpoſes to ſuch a gentle Suppuration as is moſt agreeable to the Membranes which are wounded, and without ſuch a Suppuration, would not readily unite.

It happens ſometimes that the punctur'd Part ulcers after, from the Defluxion and Inflammation; then the Pain encreaſes thro' the Whole, and the Part of the Head next adjacent ſuffers by conſent. Upon this Occaſion continue on the former Applications, and every now and then drop into the Eye ſome of the following Collirio's, to cleanſe and put a Check to the Ulcer. When the Ulceration is not great, or is but juſt form'd, make a Liquor with Roſe, Plantain and Eyebright Water, mix'd with equal Parts, four Ounces, in which diſſolve twelve Grains of Gum-Arabick to make it mucilaginous, afterwards diſſolve eight Grains of white Vitriol, five of Sugar of Lead, a Scruple of Rhaſis white Troches, and half a Dram of Sugar-Candy, when the Ulcer is more conſiderable, make a Colliry of the ſame Waters as before, to which add twenty Grains of Aloes, ten of Myrrh, and ten of Tutty prepared: Continue the Uſe of theſe Things till the Ulcer is cleans'd, after which, uſe an Eye-water made of the Troches and Sugar-Candy diſſolved in any of the Waters aforeſaid. It happens ſometimes, that at the Place of the Puncture, there grows an Excreſcence of Fleſh, which when ſmall and without Pain, may be cured by the common Methods, but when large and painful, muſt be treated the ſame Way as preſcribed for the Ulceration.

Of falſe Cataracts, *and firſt of the* Glaucoma.

HAving ſpoke of true *Cataracts*, I propoſe now to ſay ſomething of falſe Ones; that is to ſay, ſuch as are ſo from ſome particular Alterations of the *Cryſtalline*, for the moſt Part unknown at this Time, being frequently reckon'd by our preſent Author in the Number of *Cataracts*. And tho' I know that theſe *Cataracts* are incurable in their own Nature, I ſay that it is nevertheleſs neceſſary to underſtand them well, to hinder our ſelves being deceived, and confounding them with the true, and to make our Prognoſticks juſt and certain in theſe Caſes.

I ſhall begin with the Dryneſs of the *Cryſtalline*, known by the Ancient Writers by the Name of the *Glaucoſis* or *Glaucoma*, from its Colour, which is ſometimes of a Sky Blue, or a Sea Green: From whence it comes, that ſome have given the Names of thoſe Colours to ſuch *Cataracts*.

The *Glaucoma* is a particular Alteration or Change of the *Cryſtalline*, by which it being dried up, decreaſes in Bulk, changes its Colour and loſes its Tranſparency; yet it retains its uſual Form, tho' it becomes more hard and ſolid than in its natural State, and conſequently from ſuch an Alteration, there is at leaſt a remarkable Diminution of Sight: So that in all Appearance, it is the want of nutritious Juice that is the Cauſe of this Alteration. In ſhort, it is eaſy to judge that when one Part is deſtitute of

Nutrition, it will neceſſarily dry up or corrupt. It dries up when the Nouriſhment flows not in ſo plentifully as is neceſſary, and then there is an imperfect Alteration: It corrupts when the Supply is totally interrupted or ſtop'd, and then there is a perfect Alteration. This is likewiſe to be obſerved in the *Glaucoma*, for where the *Cryſtalline* continues to receive any Nutrition, there it becomes a common or plain Dryneſs, which preſerves or retains a little of the Tranſparency, and becomes of the Colour of the Air, or of a whitiſh Green, and that is that which happens oftentimes to old People. Where nothing is received, there the Change is entire, it loſes its Tranſparency, and becomes of a green Colour quite ſunk, or elſe yellow or black, or like a Hail-ſtone.

The Caſe is uſually neither preceded or ſucceeded by any Pain, either in the Beginning, or at any other Time; as to the Signs of the *Glaucoma*, they are at the firſt Appearance correſpondent to thoſe of the true *Cataract*, and thoſe *Cataracts* hereafter deſcrib'd, except that the *Pupilla* is not ſo large as ordinary, and that it retains altogether its Roundneſs. In the following, the Patient ſees as thro' a Miſt, Smoak, or Cloud, the Malady encreaſing, one may perceive that the *Cryſtalline* changes its Colour, and then it becomes of a whitiſh Green, or of a very clear Sky Colour: In ſhort, it changes to a Green, Yellow, Black or Shining, much ſunk, as I have ſaid, and then it loſes its Tranſparency, and the Sight is totally gone.

As this Alteration is made without the Membrane that covers the *Cryſtalline* being deſtroyed, I muſt advertiſe you here, that in the *Glaucoma* and other Diſorders of the *Cryſtalline* where that Membrane remains whole, the alter'd *Cryſtalline* appears almoſt always ſhining, and for this Reaſon thoſe ſhining *Cataracts* are ever ſuſpected. When the *Glaucoma* comes by a Diſaffection of the whole Eye, the Eye waſtes and dries, and when it is by any other particular Cauſe, it retains better its natural Size: So aged Eyes grow leſs, as we may obſerve by the Wrinkles of the *Uvea*.

It happens ſometimes, that the *Glaucoma* remains in an imperfect State without growing worſe, as is commonly found in Ag... In the *Glaucoma*, the *Cryſtalline* grows dry and leſs in Size, appearing by the ſame Re... ſon more ſunk than in the true *Cataract*, *&c.* It is uſeleſs to obſerve in this Place the Differences betwixt the *Glaucoma* and the true *Cataract*; that which I have ſaid being ſufficient to diſtinguiſh the one from the other. Tho' ſeveral Authors have propoſed Remedies in the beginning of this Malady, to put a Check to its Progreſs, Experience ſhows us plainly they are all uſeleſs. I have not had an Opportunity of examining into this Diſeaſe after the Death of any Perſon afflicted with it; but I have made ſeveral times Obſervations upon the Living, and ſhall give this ſingle one to ſhow in what Degree I found the *Cryſtalline* dried.

Being at *Sezan* in *Septemb.* 1700, Mr. *Houllier*, Maſter Surgeon, told me of a Farrier who labour'd under a *Cataract* altogether extraordinary. I had the Curioſity to ſee this Man, and went with the ſaid Mr. *Houllier* accordingly. I perceived that the *Cryſtalline* of the left Eye was ſo dried that the Fibres which form the outward Pellicles of thoſe Bodies laid among those of the little Pipes, which form an infinite Number of Lines very well diſpoſed, which divide from the Middle of the anterior Superficies, and ſtretch themſelves to the Circumference. The Colour of that *Cryſtalline* was of a yellowiſh Brown, and when one obſerved it by the Light, it appeared changeable: This Man who was in Years, told me, it was twenty Years ſince he loſt the Sight of that Eye.

Of the Protuberance of the Cryſtalline.

THis is a Malady contrary to that deſcrib'd before, being a vaſt Excreſcence of the *Cryſtalline*, which has not been obſerved by any Authors, or our modern Oculiſts, both one and the other having confounded it with the *Glaucoma*; I call it *Protuberance*, becauſe the *Cryſtalline* in this Caſe appears prominent, and advances itſelf forward.

This is a peculiar Alteration of the *Cry-talline*, by which it increaſes its Bulk, loſes its Tranſparency and former Figure, and becomes more ſolid than it was in its natu-ral State. If the Want of Nutrition be the Cauſe of the Dryneſs of the *Cryſtalline*, we have the ſame Reaſon to believe, that the Exceſs of it is the Cauſe of the *Protuberancy*; for it is eaſy to conceive, that when the nu-tritious Juice is a little more viſcous than ordinary, and being conveyed plentifully by the proper Ducts betwixt the *Cryſtalline* and the Membrane which covers it, it can-not circulate but with Difficulty, for Want of a due Mixture with the more ſubtle and watry Part of Fluid, for Want of which the viſcous Juices being more diſpoſed to unite, are collected together betwixt the *Cryſtalline* and that Membrane, which being ſqueezed with difficulty from thence, enters the In-terſtices of the Fibres, and is there thicken'd and detained, ſo as to increaſe the Bulk of that Body, juſt after the ſame Manner as the nutritious Juice of the Bones thickens and conſolidates, as may be obſerved in the forming of the *Callous*, or an *Exoſtoſis*.

The Signs of this Malady in its Riſe are a little doubtful; but in Courſe of Time they become very diſtinguiſhable, the Pa-tient complains of a leſſening of his Sight in one or the other Eye, or in both; the Ori-fice or Paſſage of the *Uvea* appears ſomething larger than ordinary, without contracting it ſelf, and the Circle of the *Iris* conſe-quently a little ſtraiter, without obſerving preſently any Thing of White by that of the *Pupilla*; ſo that you cannot well diſtin-guiſh this from the true *Cataract*, *&c.* the firſt Symptoms of theſe Diſeaſes being found almoſt all alike.

This occaſions no Pain either in the Be-ginning or afterwards, but if ſometimes you meet with it in the Eye or the Head, that Pain proceeds from ſome other Cauſe than that of this Diſeaſe. It is from the Largeneſs of this Excreſcence of the *Cryſtal-line* that the Cauſe of the Unmoveableneſs of the *Uvea* is aſſigned to, and from the Di-latation of its Orifice, becauſe the *Cryſtalline* being ſo diſpoſed, advances ſtrongly for-ward, preſſing upon the *Uvea*, and puſhes on the Extenſion, and hinders the Con-traction. And as the Humour which cauſes that Protuberance of the *Cryſtalline* is ſqueez'd up and gather'd under the Membrane which covers the Body, it is likewiſe from this Membrane preſſing or reſiſting that we at-tribute the Reaſon of the Evenneſs or Un-evenneſs which we obſerve in the *Cryſtalline*.

This differs from the *Glaucoma*, firſt, that in the *Glaucoma* the *Cryſtalline* receives no Nutrition, but decreaſes and dries; and this the quite contrary, for it encreaſes by a Su-perfluity of Nutrition. Secondly, that in the *Glaucoma* it is ſometimes Blue, Green, Yellow, White, *&c.* but in this Caſe it is almoſt always of the Colour of White Horn, ſmooth and ſhining. Thirdly, that in the *Glaucoma* it appears much ſunk and ſmall, and in this it riſes very much forward, and looks large. This Diſaffection is more common than the *Glaucoma*, and happens to all Sorts of People; but it is not ſo com-mon as the true *Cataract*. It is abſolutely incurable in its own Nature, and in the Be-ginning Medicines are of no Uſe, and the Operation is altogether in vain. To confirm what I have ſaid, I ſhall relate the two fol-lowing Obſervations.

Obſervation I. Some Years ago a poor blind Man came to ask my Aſſiſtance to re-lieve him. His Left Eye had been loſt ſome Time, occaſioned by an Ulcer, under which it laboured, till he had permitted a Cicatrice to cover all the tranſparent *Cornea*, and his Right Eye was afflicted with a Malady re-ſembling what I have deſcribed, which he had had about a Year. Having diſcovered the Caſe to be incurable, I adviſed him to do nothing at all to it. He on the contra-ry ſolicited me hard to perform the Opera-tion, which upon Conſideration that the Obſervation of this might be of Service either to the Perſon or the Publick, without Dan-ger to the poor Man, I condeſcended to his Requeſt. The Diſeaſe not being as yet in a Degree of Perfection high enough, the Pa-tient ſeeing a Glimmering, ſo as to diſtin-guiſh the Shadow of a Body paſſing betwixt the Light and his Eye; but the *Uvea* was motionleſs, having its Orifice much dilated, and very round.

I propoſed to my ſelf to tear off the Membrane of the *Cryſtalline*, afterwards to ſtrive to looſen it, and couch it beneath the *Foramen* of the *Uvea*, if it was not too ſtrongly tied to the Place where it is naturally ſeated. For this End I kept by me a flat Needle, cutting both Ways, which I commonly uſed; and when I had brought it betwixt the *Uvea* and the *Cryſtalline*, and I ſaw the Point of my Needle within two Thirds of the *Foramen* of the *Uvea*, I mounted it up, and preſſed it down, without obſerving any Adherence of the *Cryſtalline* with the *Uvea*, which was ſtrongly ſupported above. I then attempted to break the Membrane of the *Cryſtalline*, but to no Purpoſe, which obliged me to bear up the Point of my Needle to the upper Part of the *Cryſtalline*, to ſee if it could not be freed in Couching it. During this Action, I perceived that I had ſunk down the *Cryſtalline*, and the Patient told me he ſaw more Light, and certainly ſome Rays of Light did at Times paſs croſs the *Vitreum*, which preſents it ſelf almoſt oppoſite to the upper Part of the *Pupilla* in following the Motion of the *Cryſtalline*: But I underſtood very well, that it was not yet freed from the *Cryſtalline*, and that forcible Motion which I had impreſs'd upon its Body could not but ſink the *Uvea*; ſo that I might ſee the *Foramen* changed in its Figure, the *Cryſtalline* riſing again ſo much, that mounting the Point of my Needle, it eſcaped me at the ſame Time. In ſhort, after ſeveral Trials in vain, I gave over, and dreſſed my Patient, who was perfectly cured of the Puncture of the Needle Eight Days after the Operation, but without any Advantage; for I found the Eye ſtill remaining in the ſame Condition.

Obſervation II. Some Time after this, I met fortunately with a Countryman's Dog which had ſuch a like Malady in one of his Eyes; and deſiring more and more to diſcover the Diſpoſition of the *Cryſtalline* in this State, I tied up the Dog, and killed him, and made an anatomical Enquiry into the Part. I found the *Cryſtalline* near once as large again as that of the other Eye, having an uneven Bunch or Protuberance forward. Its Membrane, which was thicker, ſtronger, and ſmoother, making a ſtrict Adherence with the *Vitreum*. Having cut this Membrane, I ſaw the thick Humour which had ſwell'd or inlarged the *Cryſtalline*, which was White, and had a moderate Solidity like rotten Cheeſe, and was a little viſcous. This Subſtance could not incorporate with the *Cryſtalline*, which was equally White, ſomething tranſparent, and more ſolid than it uſe to be in its natural State; and the other Parts of the Eye were in their uſual Condition, except the *Foramen* of the *Uvea*, which was more dilated, and unequally round. By theſe two Obſervations, one may judge of the Nature of that Diſeaſe, and the Prognoſticks which may be made.

Of the Moving *or* Shaking Cataract.

THis Malady is likewiſe a particular Alteration of the *Cryſtalline*, which commonly proceeds from the Solution or Corruption of the *Vitreum*, by which Means it becomes leſſen'd and harden'd, grows White or Yellow, and loſes its Tranſparency; but preſerves its Situation, and remains ſuſpended and floating in the Waters. Likewiſe the Alteration of the Cryſtalline has a great deal of Analogy to the *Glaucoma*; the Alteration of the *Cryſtalline* in theſe two Caſes being found almoſt equal. In ſhewing the Cauſes of this Diſeaſe I ſhall confine them to Two: The Firſt proceeds from a ready Settling of Humours upon the Part, which preſently diminiſhes the Tranſparency; afterwards, the Humours growing ſour, they deſtroy the Membranes and deſtroy Fibres of that Part, and in the End diſſolve or totally corrupt them.

The Second Cauſe of the Diſſolution or Corruption of the *Vitreum*, proceeds from a Collection of *Pus* within the Eye, which afterwards forms it ſelf into ſome Abſceſs in the *Cryſtalline*, or betwixt the Body and the Membrane, which I ſhall ſpeak of in the next Place. The Signs of this Cauſe are theſe: When the Solution is made by ſettling of Humours, the Patient complains preſently, that he cannot ſee at all, or but little; that at that Time no Alteration in the Eye is obſerved, except the *Pupilla* be a little more dilated than ordinary, and

or Diminution of Sight be preceded violent Pains from the anterior Parts of Head, or the Bottom of the Eye; and ſometimes the Patient feels nothing. A little while after the *Cryſtalline* may be ſeen muddy or diſturbed, and in the End it becomes White, ſomething Yellowiſh; and then, from the leaſt Motion of the Eye, it ſeems to tremble and move like a Weather-cock, that moves to and again with the leaſt Agitation of Wind. The *Iris* loſes its natural Colour, wrinkles, and grows ſometimes backwards and ſometimes forwards, as it is moved by the floating *Cryſtalline*. And when this is occaſioned by a Collection of *Pus* within the Eye, theſe Signs, in their Beginning are almoſt like thoſe of the *purulent Cataract*, or other Collections of *Pus*, which I ſhall deſcribe hereafter. It is this Agitation of the *Cryſtalline* which made the Ancients and the Moderns too ſuppoſe this *Cataract* to be of the ſame Nature of thoſe which are to be couched; becauſe, ſeeing this Body move, they imagined it to be a Membrane that floated in the aqueous Humour, and therefore likely to be couched; but finding by Experience that theſe Bodies obſtructed the Patient from ſeeing any Thing, they from thence concluded this Caſe to be an Obſtruction of the Optick Nerve.

I was a long Time before I could diſcover the Truth of this, to know why, in this Malady, the changed *Cryſtalline* ſhould move from a leſs Motion, till I found an Opportunity of Diſſecting an Eye that was thus affected. But on the Eleventh of *December*, in the Year 1691, I met accidentally with a Cow which had an Eye of this Kind, and agreed with a Butcher to kill her, upon the Eye of which I made the following *Obſervation*.

Having taken the Eye from the *Orbit*, and holding it in my Hand, the little that I ſtir'd it, made the *Cryſtalline* move in every Part. I cut the tranſparent *Cornea* all about from the external Circle of the *Iris*, holding the Bottom of the Eye down, and fore Part up, to ſtop the aqueous Humour from running out. When it was cut, it flowed about a Sixth Part, and I perceived then the *Cryſtalline* floating upon the remaining Humour, and ſupported round by the Membranes and Fibres. I poured out gently this Humour into a Glaſs, and it appeared of the Conſiſtence of Water, ting'd Yellow, and without any Viſcoſity, and the *Cryſtalline* remained ſuſpended in the ſame Place, being a little more ſunk.

Afterwards I cut the *Cornea* lengthways, juſt to the Inſertion of the Optick Nerve, and then ſlit the *Uvea*, and I found that the *Tunicle* was entirely ſeparated from the *Uvea*, that it ſtuck behind to the Bottom of the Eye at the Inſertion of the Optick Nerve, and before, about the Ciliary Circle near the *Cryſtalline*; ſo that this Membrane reſembles a *Cone*, the Point of which is at the Entrance of the *Optick Nerve*, and the Baſe round about from the *Ciliary Circle*. In the Middle of the *Cone* formed by the *Tunicle*, I obſerved ſome membranous Fibres, which I believe to be the external Membrane of the *Vitreum*. In ſhort, theſe Fibres, dry, alter'd, and ſmall as they are, reſemble in ſome Meaſure the *Cone* of the *Tunicle*, and ſeem to be continued round from the Circumference of the *Cryſtalline*.

I ſeparated the *Cryſtalline* to compare it with the other Eye. It was much leſs, very dry, hard, yellow, and without any mucilaginous Humour about it. I examined it anatomically, and found that the Fibres and Pellicles were diſpoſed after the ſame Manner with thoſe of the *Cryſtalline* prepared with *Aqua Fortis*, or boiled in Water. The *Cornea*, with the reſt, and the *Uvea*, were in their uſual Condition, except the *Iris*, which had loſt its natural Colour. In comparing this Obſervation with the following, it will be eaſy to know the Difference of the Solution and Corruption of the *Vitreum*, cauſed by a Setling of Humours on the ſaid Part, from that which is occaſioned by a Collection of *Pus* within the Eye, which will be further explained.

Obſervation II. One *Claudius Merat*, a Native of *Boulage*, living at *Brandenouvilliers* near *Bar le duc*, aged Forty Years or thereabouts, came to me the 18th of *October* 1700, to take Advice about an Infirmity which had happen'd in his Right Eye the Harveſt before. At the ſame Time I took Notice that his Left Eye had a *Shaking Cataract* which had been occaſioned by a Collection

lection of *Pus* within the Eye. The dried Matter ſeemed to ſtick at one of the Extremities to the *Cryſtalline*, and at the other to the tranſparent *Cornea*, where I ſaw a Whiteneſs which appeared to me to be an internal Cicatrice, and at the Place of the ſaid Whiteneſs the *Cornea* forms a little Bunch before; where it is to be obſerved it was cut in that Place by an internal Exulceration, which had preceded ſo, that that was the Occaſion of the ſucceeding Abſceſs from the internal Superficies of that Membrane, and which was open inwardly, or that was cauſed by the Acrimony of ſome *Pus* collected in ſome other internal Part of the Eye. Upon the leaſt Motion of the Eye, this *Pus* floated and ſhaked, or was diſturbed, and as it did not cover above one Moiety of the *Pupilla* towards the lower Part, I ſaw at the ſame Time croſs the upper Moiety the *Cryſtalline* altered, and very white, floating in like Manner, and ſhaking or trembling. This Eye appeared to me to be much larger than the other, the *Cornea* being repleniſhed with large Blue Veſſels towards the White of the Eye, and with ſeveral other little Red Veſſels in ſome other Parts, and the Remainder of the Humour which fill'd the Ball looked very tranſparent. Having asked the Man the Queſtion, I underſtood it was Nine Years ſince he had totally loſt the Sight of that Eye, and that he underwent during the Space of one Year violent Pain in that Part. By theſe Two Obſervations, and what I have ſaid of the Shaking *Cataract*, one may eaſily conclude that this Malady is abſolutely incurable.

Of the Purulent Cataract, *or the* Abſceſs *of the* Cryſtalline.

NOthing reſembles more a True *Cataract* than the *Abſceſs* of the *Cryſtalline* and its Exulceration. By the Purulent *Cataract*, or *Abſceſs* of the *Cryſtalline*, I mean a Maſs or *Pus*, either in the proper Subſtance of the Body, or betwixt the Superficies and the Membrane which encloſes it, which Alteration and Dryneſs makes loſe its Tranſparency. Likewiſe the *Cryſtalline* is found at the ſame Time affected with Three gener Maladies, which is, Intemperature, an Conformation, and a Solution of Co tinuity.

When the *Pus* ſlips from the *Cryſtalli* the Ulcer that remains makes the Superfic white, unequal, and extended; the U wrinkles, and the Colour of the *Iris* chang for the worſe; the Orifice cloſes extream and the Patient can ſcarcely diſtinguiſh t Light of the Sun.

This is what Experience has given me O caſion to obſerve upon this Malady, that is eaſy to know it when it is formed in ſhort Time, but when it comes ſlowly o or by Degrees, it is very difficult to diſtin guiſh it from the true *Cataract*, tho' ſome times it may deceive us, by Reaſon of th Signs which bear ſo near a Reſemblance One *Claudius Durand*, a Man in Years, cam to me on the Firſt of *May*, 1697. who Right Eye, after Five Years, was affecte with a White Spot which covered a Part o the *Cryſtalline* like a growing *Cataract*; but a the Circumference of the *Cryſtalline* as y preſerved its Tranſparency, he diſtinguiſh the moſt common Objects of Light a Do or Window, *&c.* and upon the tranſparen *Cornea* there was a ſuperficial Ulcer join to a ſlight Ophthalmy, cauſed by the acid o ſharp Colliries that had been given him which ceaſing to make uſe of, he was ſoo cured of that Inflammation and the Ulce The Left Eye was loſt about Eighteen Mont after. That was perceived by Hairs, Thread Flakes, Clouds, and other the like Fore runners of *Cataracts*. The Middle of the *Cry ſtalline* ſeemed to be of a white a little fou or dirty, and the reſt of that Part was of Sort of an obſcure cloudy Colour. In bot one and the other, the *Pupilla* dilated an contracted it ſelf nevertheleſs more in th Right than the Leſt.

I was of Opinion, that the Spot of th Right Eye had been occaſioned by a Puſtu or ſmall Abſceſs on the *Cryſtalline*, whic was cured, and the white Cicatrice w that Spot that remained in that Condition without encreaſing; and that what appear on the Left Eye was the Beginning of a tru Cataract: But I was deceived, as the Con ſequence convinced me; for on the Secon

April, the Year following, being come me, I found the Right Eye in the ſame ndition as before; but for the Left Eye, Cryſtalline appeared to me to be ve- much ſunk, the dirty White looking rer the Colour of a thick *Pus* that is di- ted; the *Pupilla* being very ſmall and ir- ular in its Roundneſs, neither dilating contracting it ſelf to the Light, or the , or the Candle, or the Dark, or by rub- g the Eye, or any other Way; the *Iris* obſcure, and had little Life in it, but very much wrinkled. All theſe ill ns made me judge, that the Speck which eared the Year before, and which I ught to be the Beginning of a *Cataract*, a little Abſceſs of a bad Tendency, the being inſenſibly ſpread over the whole, ich in the End had rendered the *Cryſtalline* erated and purulent, and that the other in- al Parts of the Eye being altered by this , put a Stop to my undertaking the eration: For in the Abceſs and Ulcera- of the *Cryſtalline* the Operation is ab- tely uſeleſs, as are likewiſe all other s of Remedies propoſed to relieve the ns, which are great, and to hinder the luxion.

f Mix'd or Fallacious Cataracts.

the Knowledge of Falſe *Cataracts* is ne- eſſary to prevent the being deceived in founding them with the *True*, that of 'd *Cataracts* is not leſs neceſſary to ſatisfy f the good or ill Succeſs of ſuch Opera- s as we undertake, and to prevent the aſes, or thoſe Things which appertain hem, upon the Difficulties we ſuſpect to with in thoſe Caſes.

a Mix'd *Cataract*, I mean a certain Al- ion of the *Cryſtalline* which partakes of Nature of a True *Cataract* and a Falſe but as it is difficult to determine the rent Combinations of Cauſes, it is lly difficult to deſcribe juſtly all the d *Cataracts*; for which Reaſon I con- my ſelf with the following ſuccinct ount.

The Firſt Mix'd Cataract, *that partakes of the Nature of a* Glaucoma.

WHen the Humour which cauſes the True *Cataract* cannot flow but in a moderate Quantity, capable only to alter the *Superficies* of the *Cryſtalline*, in Beginning to form the Scales, and at the ſame Time to alter in ſome Part of it the Membrane which covers the Body, and which by ſome unknown Cauſe ſtops that Humour from flowing, it happens that this Humour terminates; but as the *Superficies* of the *Cryſtalline* is thus altered, and that the Pores are changed, the nutritious Juice can penetrate no farther; ſo the *Cryſtalline* fails of Nouriſhment, dries up, and the reſt of the Membrane remains entire. This ſhews after what Manner a mix'd *Cataract* is made, which partakes of the Dryneſs of the *Cryſtalline*. The Colour of this *Cataract* is ſometimes unequal, occaſioned by the unequal Alteration of the *Cryſtalline*; ſo that one Part is found white, and the other Part like Water congealed or froze. It appears much leſs and more ſunk than the *True Cataract*, and the *Pupilla* likewiſe ſeems more contracted. It is commonly ſhining, and ſometimes barr'd or croſs'd. It is, in ſhort, a long Time in growing; and ſometimes, after Five or Six Years, is not perfectly ripe. In its own Nature this Sort of Cataract is bad, being difficult to ſeparate, by Reaſon of the Membrane which covers the *Cryſtalline*, which is always in a Manner whole, and fix'd to the Body, that ſometimes 'tis impoſſible to looſe it from thence. This Cataract, when old, may appear with ſuch good Signs upon a new Defluxion of Humours as to look like a *True Cataract*; but I can give no Example of ſuch as might ſeem likely to ſucceed, as partaking more of the *True Cataract*: But here is one of thoſe which participates more of the *Glaucoma*.

A poor Man having loſt his Left Eye by a Diſeaſe from which he could get no Remedy, and the Right Eye labouring under a *Cataract*, which I ſuppoſed to partake of the *Glaucoma*, came and beg'd of me to make the

Opera-

Operation upon him. This *Cataract* looked white, moderately ſhining, ſmall and ſunk. The *Pupilla* was likewiſe a good deal leſs than that of the *True Cataract*, and could neither dilate or contract but very weakly; yet when I put my Hand betwixt the Eye and the Light, he could diſtinguiſh the Shadow: The Remainder of the Eye was well diſpoſed. When this Cataract was ripe, it was very ſuſpicious, the ill Signs prevailing over the good. I would have diverted him, but he ſolicited the Operation, which I performed the Fifteenth of *April*, 1698.

When my Needle was in the Eye, I conveyed it ſeveral Times upon the *Cataract*, to couch it according to the uſual Way, but to no Purpoſe. I drew back my Needle a little, to carry it towards the upper Part of the *Cryſtalline*, which I preſs'd ſomething cloſe to endeavour to break the Membrane, and couch the Body, which I repeated two or three Times in vain. In ſhort, I made the utmoſt Effort, which was to prick into the *Cataract*, and ſink after that the Point of my Needle, thinking by that Means to tear off a great Part of the Membrane that contained the *Cryſtalline*; but it happened to me juſt as it had done once before deſcribed, that by this forcible Motion I made upon the *Cryſtalline* it ſunk a little, but only ſo as to fly from under my Needle, and regain its former Situation. I repeated the ſame Motion, and ſeeing I could get no Ground, I withdrew my Needle, and dreſs'd the Patient, who laboured afterwards under a painful Inflammation that laſted Seven or Eight Days, and in Sixteen the Puncture was entirely healed, but without any Benefit from the Operation.

A Mix'd Cataract, which partakes of the Protuberance of the Cryſtalline.

THis Cataract, beſides the common Signs of the Two Maladies to which it has more Relation, has its Particularities. Of all the Mix'd *Cataracts*, this is the ſloweſt in Forming, and the *Cryſtalline* preſerves the longeſt Time a Part of its Tranſparency, ſo that the Patient diſtinguiſhes the Light confuſedly, the moſt lively Colours, or any other common Objects. It is in its natural State of a ſhining White, and ſeldom changes Colour. The *Pupilla* is found more dilated than in the True Cataracts, and ſomething leſs than in the ſimple Protuberance, and it neither dilates or contracts, but with great Weakneſs. This Cataract remains ſometimes in Condition for Couching, Five, Six, Seven, and Eight Years, and ſometimes is incurable, becauſe the Membrane that covers the *Cryſtalline* keeps whole, and ſeveral other ill Symptoms ariſe, as in the following Obſervation.

Mr. *Pouard*, a Curate in *Paris*, being afflicted with Two *Cataracts*, I was deſired to go and ſee him in the Beginning of the Spring, 1698. Theſe Two Cataracts appeared white, ſhining, large, and pretty ſuperficial. Their *Pupilla's* were ſomething more dilated than in the True *Cataracts*, and they both contract and dilate feebly when any Thing paſſes betwixt the Light and the Eyes, the *Pupilla* of the Right Eye appearing whiter and larger. By theſe Signs I judged that the *Cataracts* were mix'd, and of the Nature of that I have deſcribed, and conſequently doubtful or uncertain.

There was an Oculiſt famous for his Performances, and really a very honeſt Man, having ſeen this Perſon before me, aſſured him, that theſe Cataracts were both ripe and good. He ſaw him again afterwards, and aſſured him then, that they were in a Condition fit to be couched, and would ſucceed well. He offered at the ſame Time to perform the Operation, and I cannot tell for what Reaſon; but Mr. *Pouard* gave him Thanks, and diſmiſs'd him. Some Time after he ſent to know when I would come the Way. I went to ſee him, and found him reſolved to undergo the Operation. The *Cataracts* did not appear to me eaſier to cure than the firſt Time I ſaw them, and I doubted entirely of the Succeſs. Nevertheleſs reflecting on the Honeſty and Experience of the Oculiſt, and upon the Opinion which he gave of theſe Cataracts, I believed I might be in the Wrong; but I was convinced of the contrary, for having agreed with *Sieur Pouard* to perform the Operation, which was deferr'd to the 16th of *September* following to give him Time to prepare himſelf, I then began with the Right Eye, that

ract appearing riper and better; but my eedle was no ſooner in the Eye, but I found e Miſtake I had made. It was impoſſible or me to ſeparate the *Cryſtalline* from the *itreum*, I having tore or ſlit the Membrane, I underſtood by a Sort of Whiteneſs of e Aqueous Humour, which could not come ut by the Superficies of the Cataract being roke off into the ſaid Humour by the Mo- on of the Needle, I preſs'd hard upon it the ſame Motion, but to no Purpoſe. fter the Operation was over, a Fever ſuc- eeded from the Pain of the Eye, and a very onſiderable Inflammation without and ithin, which occaſioned ſome Diſorder in e ſame, as I underſtood after the Symptoms ere abated.

Of the Mix'd Cataract, *which partakes of the Purulent One.*

HE purulent *Cataract* is the moſt com- mon of all the Mix'd *Cataracts*, and the rdeſt to diſtinguiſh. During the Time a ue *Cataract* is forming, or when it is al- oſt formed, and before the Membrane ich covers the *Cryſtalline* is waſted, if the tritious Juice which is conveyed betwixt t Membrane and the *Cryſtalline* be inter- pted and broke, or it meets with ſome er Cauſe capable to impoſthumate or exul- ate the *Cryſtalline*, and to deſtroy the for- g of the Attendants, it makes a Mix'd *ract*, which partakes of the Abſceſs the *Cryſtalline* or of its Exulceration. all the *Cataracts* of this Kind, that is the eſt to couch where the Eye is found mud- or confuſed during the Operation, becauſe Membrane of the *Cryſtalline* is more ted, or elſe being much leſs changed, the *alline* ſeparates without any Difficulty. for Example:

he 24th of *September*, 1691. I couched o *Cataracts* of a Carpenter of *Boulage*, o was an ancient Man. Theſe *Cataracts* ared true and good before Operation, Colour being of a greyiſh or aſh-co- d White, the *Pupilla's* dilating and con- ing themſelves neither too quick nor low, having ſhown before all the Signs are the Fore-runners of true *Cataracts*. rtheleſs, when my Needle was in the Right Eye, and when I touched the *Cataract*, I ſaw a thick *Pus* iſſue out in a ſmall Quantity, which did not muddy the Aqueous Humour. Afterwards, the Cataract ſeparated without Pain, and precipitated as uſual; but there remained a white Speck on that Part where the *Cryſtalline* lodged about the Size of a Fourth Part of the Sight, placed almoſt in the Middle.

The *Cataract* of the Left Eye was the laſt formed, it being likewiſe ſomething leſs ripe, and whiter than that of the Right Eye. When I had thruſt my Needle into the Eye, and reached the *Cataract*, I ſaw a *Pus* ſtream out that was thinner than the former, and much about the ſame Quantity, which muddied the Aqueous Humour a little, for which Reaſon there was more Trouble in ſeparating and couching the *Cataract*, which I finiſhed nevertheleſs; and as the Aqueous Humour was ſomething diſturbed, I could not ſee the *Pus* ſo well that came from them.

Some Days afterwards I went to ſee the Patient, and found the Speck on the Right a little leſſened, the Left Eye clear, and at the Bottom a Cloud that was almoſt ſpread over the Sight. In the Sequel, the Speck of the Right Eye decreaſed ſo that there appeared nothing but a very ſuperficial Cloud, and that of the Right Eye was almoſt entirely gone. The Patient was troubled ſome Time after to bear the Light, and did not ceaſe to ſee ſome ſlight Clouds before both the Eyes, yet could ſee well enough to guide himſelf, and to diſcern any common Objects.

Of the Diſlocation, or forcible Diſplacing of the Cryſtalline.

THis forcible Diſaffection of the *Cryſtalline* may beſides be lodged in a great many *Cataracts*, ſince the *Cryſtalline* acquires oftentimes the ſame Intemperature which is obſerved in the *Glaucoma*, and which equally obſtructs the Sight. This extraordinary Kind of *Cataract* is an Alteration that happens to the *Cryſtalline*, by having been removed from its Place by ſome Stroke received upon the Eye, by which Means it dries, wants its Nouriſhment, loſes the Tranſparency, becomes

white, and is deprived of Sight. It is eaſy to conceive how a Stroke upon the Eye may violently ſhake all the internal Parts of that Organ, ſoon break the delicate Membrane which covers the *Cryſtalline*, and which ſliding from that Membrane, it becomes eaſily puſh'd forward by the *Vitreum*, upon which it is ſupported, and that in this Condition being debarr'd of Nutrition, it muſt neceſſarily be altered and dried up.

The Signs of this Malady are very apparent. In conſidering the Eye, if the Stroke is ſo given that the Blood is extravaſated within, it denotes that ſeveral internal Parts are concerned. In ſeeing the *Pupilla* more dilated than ordinary, it diſcovers the *Cryſtalline* is preſs'd againſt the *Uvea*, as I have ſaid, ſpeaking of the Protuberance of that Body, and is ſometimes more in Motion, or elſe is very obſcure. In the Beginning, as the *Cryſtalline* is yet tranſparent, the Patient ſees but very confuſedly, becauſe the *Cryſtalline* being advanced more forward than it ſhould be, the Refractions of the Rays of Light appear to be falſe.

When the *Cryſtalline* is preſſed equally upon the *Uvea*, its *Orifice* or *Foramen* is much larger, and retains its Roundneſs; but when it is preſs'd unequally on ſome of the Sides, the *Foramen* or Paſſage of the *Uvea* becomes Oblong, or of another Figure. I know none that ever tried an Operation on this Kind of *Cataract*; but all Authors agree that it is very ſuſpicious, and that we ought to avoid medling with it. However I ſhall give you an Inſtance of what I have met with in this Nature.

Being at *Sezan* ſome Years ago, a young Man came to me to ask Advice upon an Accident that happened to him ſome Days before: Playing at Bandy-Ball or Crekit, he received a Stroke on one of his Eyes from the Ball, ſo that he loſt the Uſe of that Part, not being able to ſee the Light but confuſedly. He had a ſlight *Echimoſis* underneath the *Cornea*, which diſperſed well enough by the Aſſiſtance of Bleeding, and ſome little Defenſatives applied to the Eye. The *Cryſtalline*, which from hence was a little muddy, ſeemed to reſt upon the *Uvea* in an equal Situation; the *Pupilla* was much dilated and round, having no other than an obſcure Motion. As the *Cryſtalline* was hitherto a little tranſparent, the Patient could ſee the Light, without being able to diſtinguiſh any Bodies. I gave him my Opinion upon this Accident.

Four or Five Months after, returning to *Sezan*, he came to me again, to know if I could remove this Obſtruction of his Sight. I found then the *Cryſtalline* of a fine White, very like a laudable *Cataract*, the *Uvea* in the ſame Condition as before mentioned, and the Patient ſaw no otherwiſe than thoſe who labour under true and confirm'd *Cataracts*. The Eye appeared neither bigger or leſs than the other, and the Colour was good. And having told him that ſuch a Caſe was too deſperate to hope for any Succeſs, he contented himſelf with the Bleſſing he enjoyed of the other Eye, without asking me further to undertake an Operation which I always refuſed to perform for the Reaſons aforeſaid.

Of Specks or Spots in the Cryſtalline, *and continual Imaginations or Appearances in the Eyes.*

AFter having treated of the Diſeaſes that alter the *Cryſtalline* throughout the whole Subſtance, which I call *Cataracts*, it remains in order to finiſh the Deſcription of the Maladies attending this Body, to ſay ſomething of ſuch a particular Alteration of a ſingle Part of that Subſtance which I call a Speck or Spot, and occaſionally to ſay ſomething touching certain Appearances in the Eye which I call perpetual, which are taken ſometimes for the Fore-runners of *Cataracts*.

By the *Spot* of the *Cryſtalline*, I mean a Kind of Cicatrice, which is ſometimes white when obſerved on the Superficies, and which hurts the Sight. It is often the Conſequence of a little Abſceſs or Pustule that forms it ſelf upon the Superficies of the *Cryſtalline*. The Humour being in a very ſmall Quantity, and mild, is waſted and without cauſing any other Alteration than that of the Place where this little Puſtule is found, and this Part of the *Cryſtalline* cicatrizes it ſelf afterwards. In the Begin-

is known by a ſmall Cloud upon the *Cryſtalline*, which grows thicker by Degrees, and at laſt white.

Obſervation. Having by Accident ſeen a Cow that the Butcher was carrying to the Slaughter-houſe, that had ſuch a like Spot or Speck upon the *Cryſtalline* of one of her Eyes, I deſired the Butcher to let me have that Eye, which I opened, and obſerved upon the outward Superficies of the *Cryſtalline*, and a little on the Side, a white Spot reſembling one of the white Cicatrices which remained on the tranſparent *Cornea* after an Ulcer on that Part. It was of the Size of a *Lentil*, very ſhining and ſmooth, and ſunk into the *Cryſtalline* the Thickneſs of a Farthing. The Membrane which covered the *Cryſtalline* was whole, without being any Thing ſpotted or altered at the Place where the Speck was, and all the reſt of the Eye was in a good Diſpoſition. The continual Imaginations are certain ſeeming Appearances before the Eyes, that reſemble Threads, Moats, Flies, Flakes of Wool, Snow, or the like, which ſeem at a Diſtance before the Eyes, without obſerving any Vice within their Balls. They are called Imaginations, becauſe of their Analogy to thoſe which precede *Cataracts*, and perpetual or continual, becauſe they laſt the whole Courſe of a Man's Life, without being ſucceeded with *Cataracts* as the others.

The Second Part: Containing, the Diſeaſes of the Vitreum, *the* Aqueous Humour, *the* Retina *or* Tunicle, *the* Optick Nerve, *the* Uvea, *the* Cornea, *and the Membranes which form the White of the Eye. And Firſt,*

Of the Vitreum.

AS to the Diſſolution and Corruption of the *Vitreum*, I ſhall refer you to what has been ſaid already of the *Shaking Cataract*, and ſay no more of it here; only obſerve to you, that this is of the Nature of the incurable Maladies, and ſo proceed to the unnatural Extenſion of the *Vitreum*.

If the Humour which fills and extends the *Vitreum* be not altered during the Time it remains upon the Part, it is a Sign that it is pure and natural, and that it is nothing elſe but the nutritious Juice of that Part, which is no Ways faulty, but as it is too viſcous, and cannot circulate freely; otherwiſe, if it was a foreign, acid, or malignant Humour, which was intimately mix'd with this Juice, it changes and produces a Diſſolution of this Body, as I have ſaid before, ſpeaking of the *Shaking Cataract*. This Malady, in the Beginning, is very hard to diſtinguiſh from the *Protuberance* of the *Cryſtalline*, as well as from the real *Cataract*, in having almoſt the ſame Signs; only there is a conſiderable Difference in the Conſequence.

Men of melancholy and bilious Conſtitutions are ſometimes afflicted with this Malady; but the Perſons who are moſt ſubject to it, are Breeding Women who are in the like Condition, and whom this Diſeaſe frequently attacks in the Second Month of their Gravitation, and continues ſometimes to their very lying down. Our modern Practitioners confound this Diſeaſe with the *Gutta Serena*, by Reaſon there appears no other Fault in the Eye but in the Dilatation of the *Pupilla*; however, I ſhall ſhow you the Difference when I come to ſpeak of that Malady. To cure this, in the mean Time I think it proper, both in the Beginning and Continuation of the Diſeaſe, to bleed in the

Arms, and in the Jugular Vein, in the Temples, and likewiſe in the Feet; for the Suppreſſion of the *Hemorrhoides* in Men, or the Courſes in Women, proceeding from a Plenitude. In the next Place, to make a *Fontanelle* betwixt the Shoulders, and Bliſters before or behind the Ears, and other Remedies of the like Nature, which evacuate and revulſe, and which may be uſed according to the Violence of the Malady, and the Strength of the Patient. Purgatives are likewiſe proper, eſpecially in the Declenſion or going off of the Diſtemper, and eſpecially ſuch as are accounted more ſpecifical in this Caſe, as *Pilulæ ſine quibus*, from a Scruple to a Dram, taken early in the Morning; ſo *Hiera*, with *Agarick*, or *Cochy Pills* in the ſame Doſe.

Theſe Purgatives are to be repeated every Six or Eight Days, and ſometimes oftner, if thought neceſſary. As to Women with Child, Caution ought to be uſed, and they ſhould follow the Advice of the Phyſician. Thoſe Days that are not imploy'd in Purging, ought to be dedicated to ſuch alterative Drinks, and the like, as follows. Take an Ounce of *Salſaparilla* Root, and half as much of *China*; infuſe and boil them in two Pints of Water to a Third Part waſt, and drink a Wine Glaſs of it Morning and Evening to aſſiſt Perſpiration, and conſume the viſcous Humour that is ſpread over the *Vitreum*.

Of the Solution *and other* Diſeaſes *of the* Vitreum.

THE *Solution* of Continuity of the *Vitreum* ſometimes happens by a Stroke received upon the Eye, which bruiſes and breaks that Body, or by a Wound on the Eye made with a pointed or cutting Inſtrument, or by the Corroſiveneſs of a purulent Matter flowing in the Eye, and an Infinity of other Accidents, whereby this Part is not only affected, but likewiſe the adjacent Parts; ſo that conſequently from ſuch Diſaffections, the Confuſion and Deſtruction of the Eye is common. To this is alſo attributed ſeveral others, as when there is a Conſumption or Leſſening of the Bulk of the Eye from the Want of Nutrition: But as this Malady has Relation to the *Atrophy* of all the Eye, I ſhall treat of it under that Head.

But as the Membrane which covers the *Cryſtalline* in theſe Caſes becomes much thicker in being ſoaked in abundance of the Watry Humour, ſo it makes it loſe its tranſparency, relax it ſelf, and become wrinkled; or it is affected with little Puſtules, ſmall Ulcers, and Cicatrices, from whence ariſes the leſſening of the Sight. But as I ſhall not take Notice of other Diſeaſes of this Membrane, which I have mentioned in treating of the different Alterations of the *Cryſtalline* and the *Vitreum*, and ſuch Things as have attended it, by the Deſtruction of the other internal Parts of the Eye, or by the purulent Matter ſpread over the Ball; ſo there are ſeveral common Diſaffections, which would be uſeleſs and unneceſſary to ſpeak of in Particular.

Of the unnatural Superfluity of the Aqueous Humour.

THE Aqueous Humour is in Fault when it is too much in Quantity: The Inflammation of the external Parts of the Eye is ſometimes the Cauſe, becauſe the Blood being ſtop'd in the Veins, the Aqueous Humour cannot circulate freely, ſo that it makes a Stand in the Ball of the Eye, and extends it ſelf. The large Settlings of the pituitous and viſcous Humours upon the Eye does likewiſe conſiderably encreaſe this Humour.

This Diſeaſe is known by the Ball of the Eye being a little larger, and more conſpicuous than ordinary, by the Difficulty of Sight, by the natural Spreading of the *Pupilla*, and by the ſeveral Diſaffections that directly attend it. When the Inflammation ceaſes, the Circulation of that Humour is reſtored, and the Eye returns to the Condition in which it was before. In like Manner too great a Quantity of the Aqueous Humour, which ſucceeds the Inflammations of the external Parts of the Eye, produces from the very ſame Cauſe ſome Diſorder; but when it is cauſed by the large Settlings of Humours, ſometimes it is altered and corrupted after the ſame Manner as the other internal Parts.

For

the Cure of this, I ſhall lay down no-
ng particular, but refer you to the prin-
l Diſeaſes on which this depends, as
ll be found hereafter in the common Diſ-
es of the Ball of the Eye.

the Diminution and Watering or Running of the Eye.

is a Vice in the Eye when it grows leſs,
or runs with Water. The Leſſening hap-
s either from old Age, or by ſome violent
eaſe, or an Atrophy or Waſt of the Eye;
t waters by being prick'd, or by Wounds
Ulcers that penetrate the *Cornea*; but
whatſoever this Diminution is made, the
ſinks, the *Iris* wrinkles, and ſometimes
Cornea, and the Patient diſcerns Objects
h great Difficulty. When this Diminu-
happens through extream Age, it is very
that the Humour gathers again in any
antity, ſufficient to hold the Ball of the
extended as it was before.

Of the Diſeaſes of the Retina *or Tunicle of the Eye; and firſt of the* Nyctalopia, *or Night Blindneſs.*

the *Tunicle* is a Covering, or rather a
ine Web, and very tender from the ſoft
exquiſite Fibres of the Optick Nerve
reof it is formed, as I have ſaid in its
per Place, we may ſuppoſe that the Diſ-
s which attack this Membrane do ſome-
s at the ſame Inſtant affect the Optick
ve, and that thoſe who feel Pain in the
have likewiſe Pain in the other.

n Oculiſt cannot always diſcover the
aſes of the Parts. They may ſometimes
very diſtinguiſhing Signs, whereby a
gment may be given of their Exiſtence;
when a Patient who has always ſeen well,
where the Eye does not appear to be af-
d, complains that he ſees pretty well in
ll Light, but that it is troubleſom to
to ſee in the Shade, or where the Light
s, and that he cannot ſee at all in the
t, or when the Moon ſhines; and this
e Malady called by our Authors, the
alopia.

When this Diſeaſe is inveterate, ſo that the Fibres of the Tunicle have too great a Conſiſtence, which is uſually incident rather to Age, it is incurable; but it may be cured when freſh, and it happens that the ſame Fibres are endowed with ſome thick viſcous Humours; and particularly if they are young People that are ſo affected, which are now and then cured without any Applications: But as there are no Signs to lead us into a Knowledge of this Diſeaſe except the Information of the Patient, ſo there is no Way to judge whether this Caſe is curable or no; for which Reaſon it is always adviſeable in the Beginning, to uſe ſuch Remedies as are proper for this Diſeaſe, which may be found under the Firſt Head of this Second Part. Some Authors adviſe ſeveral *Colliries* for this, which indeed are good for ſome Diſeaſes of the *Cornea*, and which are uſeleſs as to this; becauſe they are not able to penetrate into the Part where the Diſaffection lies. The *Idea* which they form to themſelves of this Malady may be ſome Excuſe for their Practice, but the Inſufficiency of their Applications muſt undoubtedly render them inexcuſable.

Of the Blindneſs *of the Day, or* Hemeralopia.

IF on the contrary a Patient complains, that in the Day-time it is troubleſome to him to bear the Light, and that he cannot but with Difficulty diſtinguiſh common Objects, and that in the Shade, the Night, or the Dark, he can ſee with Eaſe, one may judge from thence that this Malady is an Affection of the *Tunicle*; from whence it comes, that the Fibres of that Membrane are more ſhrunk than they ſhould be, either by ſome Inflammatory Diſpoſition, or by their Dryneſs, which makes it that the Tunicle is ſo ſenſible, that a Light a little too ſtrong ſhakes the Fibres too much, and wounds them, and that they ſuffer a weak Light, only neceſſary for Sight, without Pain.

The Inflammation of the Tunicle is occaſioned oftentimes by a violent *Ophthalmy*, or by the Puſtules, Abſceſs, or Ulcers of the *Cornea*, or by Wounds of that Membrane;

be;

becauſe in all theſe Accidents the *Cornea* cannot be inflamed without the *Uvea* and the Tunicle ceaſing to contract in the ſaid Inflammation. From whence it comes, that uſually the Patients who are afflicted with theſe Maladies complain of a grievous Pain in the whole Eye. When this happens, from whatſoever Cauſe it proceeds, it is generally cured as a Symptom, by having the Cauſe removed, which is done readily, if the Malady has not been long habitual, or proceeds from ſuch a Dryneſs as nothing but a regular Method of Living and Time can overcome.

Of the Diſaffection of the Optick Nerve, called the Amauroſis, *or the* Gutta Serena.

IN Relation to the Diſeaſes of the Optick Nerve, the moſt conſiderable is the *Gutta Serena*, which is a Blindneſs that comes ſlowly, by little and little, or elſe all at once, ſometimes upon one Eye, and ſometimes on both. It is believed that the moſt common Cauſe of this Malady is a pituitous Humour, very groſs and viſcous, that falls from the Brain into the Optick Nerves, and ſhuts them up in ſuch a Manner, that the Animal Spirits can no longer flow through them.

The Cauſe that is leaſt Common is the Compreſſion of the Optick Nerves, which happens either by a Collection of the Humour, which is made by the Way of Defluxion or Congeſtion, and which forms ſome Tumour in ſurrounding of the Nerves, or by ſome Extravaſation of Blood ſucceeding the Wounds made in the fore Part of the Head, as I have ſeen in two Perſons wounded; or which are Conſequents of Wounds or Contuſions which penetrate into the Orbit, and occaſion an Extravaſation of Blood, or when the Inſtrument produces this in penetrating the Orbit, preſſing down the Ball into the oppoſite Part without, or violently ſtretching the Optick Nerve.

We may hence underſtand, that the *Gutta Serena* is properly a *Paralyſis* or Palſy of the *Optick Nerves*, and conſequently of the *Retina*, where the Cauſe is like that of the Palſy of other Nerves of the Body, which makes it ſo that the Spirits cannot be conveyed by thoſe Nerves, they entirely loſe their Senſibility; inſomuch that the Rays of Light which enter into the Eye ſtriking upon the Tunicle, draws off the Image of the Objects from the Parts where they ſhould be impreſs'd, ſo that there is more Viſion than there is Senſation. When the Sight is loſt all at once, without any external Cauſe, we may judge that the *Gutta Serena* is occaſioned by a Defluxion of a groſs Humour which ſtops the Pores of the Nerve or relaxes the Fibres when the ſudden Loſs of the Sight is from an external Cauſe, as happens from a Wound penetrating the fore Part of the Head, or from Wounds or Contuſions which enter the Orbit; then we muſt reſt aſſured, that it is an Extravaſation of Blood which is the Cauſe, or that the Optick Nerve has been too violently ſtretched or the Globe of the Eye too much compreſs'd; but when the Sight is loſt by Degrees, we may underſtand it comes from ſome Tumour which is made from about the Optick Nerves, either within the Head, or in the Orbit.

We may diſtinguiſh the *Gutta Serena* from the Night-Blindneſs, in that in the *Gutta Serena* no Light at all is diſcern'd, but in the other they can diſtinguiſh Objects very well in a bright Day. Likewiſe the Extenſion of the *Vitreum* is eaſily diſtinguiſhable, becauſe in that Caſe the Ball of the Eye appears ſometimes a little more prominent, the *Pupilla* always dilated more than ordinary, and the Patient ſees ſome Light, tho' he cannot diſtinguiſh common Objects; whereas in the *Gutta Serena* the Ball of the Eye is conſtantly in its natural Extenſion, and the *Pupilla* remains motionleſs, and cannot dilate itſelf at all, ſo that the Blindneſs is total, and we might as well ſearch for the Philoſopher's Stone as find out Remedies for the Cure of the *Gutta Serena*, it being abſolutely incurable; and if ſome Authors pretend to make a Cure, I doubt they deceive themſelves, and take the Extenſion of the *Vitreum* in *Night-Blindneſs* for the *Gutta Serena*, which may be eaſily confounded together if great Care be not taken.

the Diſeaſes *of the* Uvea; *and firſt* Inflammations, *and the* Abſceſs.

Since all the Parts which are nouriſhed by Blood are ſubject to be inflamed and ſtumate, we may judge that the *Uvea* y be affected with an *Inflammation* and *ceſs*. The Inflammation is either General, Particular: The General Inflammation en happens in the Diſeaſes which at the me Time attack all the internal Parts of Ball; and the Particular happens not in ſome Part of the ſame Membrane, the more it is ſo, the more ſubject it is the Abſceſs. When this is at the fore rt of that Membrane, it appears athwart m the tranſparent *Cornea* as a red Spot; and hen it is towards the hindmoſt Part, one not eaſily diſtinguiſh any Thing. When Inflammation is reſolved, it is not from ault of the *Uvea*; but when it ſuppu-es, it forms an Abſceſs, which, when it is ſmall, and the Matter laudable, opens and pties it ſelf into the Eye without altering the other Part, becauſe the Matter pre-pitates it ſelf at the Bottom of the Eye, and re remains nothing at the Place where Abſceſs was but a black or white Spot, ich is the Cicatrice, being leſs than I have en of the like Nature upon the *Iris*, after Cure of ſmall Puſtules, or an Abſceſs; t when the Abſceſs is more conſiderable, he Matter malignant, it is ſometimes the caſion of an Alteration of all the internal rts of the Eye, or at leaſt the Deſtruction one Part of that Membrane.

Beſides the former, the *Uvea* is ſubject to acerations and Wounds when the *Cornea* ut or prick'd, or Strokes are received up-the Eye, which frequently happens about *Pupilla*; ſo that it changes its round Fi-re into an irregular one, and ſometimes kes an extraordinary Dilatation: But as ſe Accidents are not relieved by any Ap-ications, it will be unneceſſary to ſay any ng farther of them.

Of the Unnatural Size and Prominency of the Ball of the Eye, called the Exophthalmia.

I Do not deſign here to treat of ſuch large Goggle-Eyes as may naturally be met with in ſome Perſons, or of ſuch Sort of jetting out of the Eye which happens after a Relaxation or Palſy of the Muſcles; or in ſhort, to ſpeak of ſuch prominent ſtrutting Eyes as are made ſo by the Violences occaſioned from a difficult Reſpiration, Teneſmus or Vomiting, a tedious Delivery in Childbed, or any other Cauſes which may intercept the Motion of the Blood, *&c.* But of ſuch an unnatural Prominency of the Ball of the Eye, which is ſo raiſed ſometimes as to ſtart out of the Socket without being able to be covered by the Eyelids, and which is attended with violent Pains of the Eye and Head, with a Fever, and Want of Reſt.

This Malady is cauſed by a ſudden Setling of a hot, acrid and viſcous Humour, which encreaſes beyond Meaſure, not only the Humour which naturally fills the *Vitreum*, but likewiſe the Aqueous Humour, and which waters at the ſame Time the internal Parts of the Ball, and which ſometimes changes, and ſometimes deſtroys them. The Heat and Acrimony of this Humour ſhow themſelves by the internal and external Inflammation, and by the Pain of the Eye; and the Viſcoſity is apparent from the Bulk and Fullneſs of the all, ſince it could not be made ſuch but by the Conflux of that Humour, and that Conflux could not be there but thro' a Deficiency of the Circulation of that Fluid; or elſe it is occaſioned by a Humour leſs hot and acrid, but very viſcous, which is collected together, and inſenſibly increaſes the Bulk of the Eye-Ball to ſuch a Degree, that ſometimes it ſtruts entirely out of the Orbit. When the *Vitreum* grows beyond Compaſs, it is ſhown by the extraordinary Dilatation of the *Pupilla*; and when the Aqueous Humour equally increaſes, we may judge of it by the Depth and Length of the *Uvea*, and by the Prominency of the tranſparent *Cornea*.

The

The Eye-Ball cannot grow extravagantly but it muſt advance out of the Orbit, and it cannot ſtart thence without a violent Extenſion of the Optick Nerve, the Muſcles of the Eye, and all the Membranes; and hence ariſes that great Pain the Patient feels continually at the Bottom of the Eye and the Head, and which is the Occaſion of the Fever, the Want of Sleep, and the Inflammation, which may be obſerved not only in the inward Parts of the Eye, but ſometimes alſo in the outward Parts; and this Pain is the more exquiſite, as the Humour which produces the Malady is hotter or more acrimonious.

In treating of this Malady, ariſing from what Cauſe ſoever, we ought to have ſpecial Regard to the Plenitude of the Body, by bleeding the Patient in the Arm two or three Times, and ſometimes oftner, on the ſame Side with the diſaffected Eye, according to the Condition of the Diſeaſe and the Strength of the Patient: Or elſe open the Jugular on the ſame Side, or the Artery on the Temples, to revulſe from the Part affected; for the ſame Reaſon we apply Bliſtering Plaiſters behind the Ears; and if we think the Diſeaſe of a long ſtanding, we make an *Iſſue* or a *Seton* in the Nape of the Neck. In the Beginning, apply to the Part cooling and emollient Waſhes; and inwardly, cooling Juleps, Emulſions, or Apozems, and other Remedies proper to allay the Motion, and ſweeten the Blood, obſerving at the ſame Time to preſcribe an exact Regimen for the ſame Purpoſe. All theſe general Remedies ought to be adminiſtred with Order and Diſcretion, purſuant to the Advice of an able Phyſician.

When the Humour which occaſions this Diſeaſe is hot and acrid, take diſtill'd Waters of Roſes, Plantane, Lettice, Nightſhade, Poppy, or other Coolers, in one of which mix the White of an Egg for a Colliry, in which ſteep your Compreſſes, which apply upon the Eye, the Forehead, and the Temple, on the grieved Side; or elſe put Fifteen or Twenty Grains of Sugar of Lead into two Ounces of any of the Waters aforeſaid for the ſame Purpoſe. Theſe Things ſerve for no other End but to temper the Heat and Inflammation of the external Part of the Eye, being of little Uſe to the internal Parts, the outward Coverings of the Eye being too ſ[o]lid to be penetrated by Medicines of ſo li[t]tle Force.

The Malady being in its Declenſion, [w]hich is known by the leſſening of the Inflamm[a]tion and the Pain, it is Time then to [u]ſe *Reſolutives*, ſuch as Linſeed and Fenugreek of each two Drams; Camomil and Melilot Flowers, of each two Pugils; Frankincenſe two Drams; which being boiled together, in[-]fuſe in a due Quantity of Fennil, Rice, Eye-bright, or Celandine Water, ſtrain through a linen Cloth, and then diſſolve in it ten or twelve Grains of Camphire, and where the Inflammation is not too great, add a little Spirit of Wine.

Of the Atrophy *or* Waſting *of the Eye.*

THis Malady is directly contrary to the [o]ne deſcribed juſt before, being a Diſaffection of the Eye-Ball, which for Want of Nutrition waſts away, dries up, and ſinks to the Bottom of the Orbit, with an entire Loſs of Sight. Some Authors believe this proceeds from great Evacuations, as continual Crying, an immoderate Flux of acrid Humours which is made in ſome Diſeaſes of the Eye, exceſſive Age, and the Hectick Fever, may be the Cauſe of the Atrophy of the Eye. In this Caſe, the Part of the *Uvea* which forms the *Iris* wrinkles and dries, by Reaſon of the Dryneſs of that Membrane, the natural Colour of the *Iris* changes, the Tunicle dries and withers, the *Vitreum* leſſens its Bulk, the Cryſtalline alters, as ſometimes it does in the *Glaucoma*, and the Aqueous Humour is conſumed in Part, or entirely abſorbed. Some Authors direct Frictions, Fomentations, and other acrid Colliries, which provoke Tears plentifully, by irritating and warming the Eye, in order to ſtir the Blood and Spirits; others again condemn this Practice, as drying too much, and encreaſing the Atrophy: And ſome others, as the Ho[l]ſt Method, propoſe Colliries which have but a little Heat and Acrimony, to warm the Eye gently, and prick the Fibres a little, ſo as to give Action to the Spirits. But I [w]ill not give my ſelf the Trouble to examine which of theſe Opinions are beſt, believing

em all to be equally uſeleſs, ſince I never t ſaw an *Atrophy* of the Eye cured by any edicines whatſoever.

Of the Synchiſis *or Diſorder of the inward Parts of the Eye, or their Confuſion.*

THE violent Strokes received upon the Eye, or that which is the ſame Thing, e Falling of ſome heavy or hard Bodies, make ſometimes ſuch an Impreſſion upon that Organ, that the external Parts of the *Cornea* are not only contuſed, but likewiſe the internal Parts are found at the ſame Time torn, broken and divided in ſuch a Manner, that they can no longer preſerve their natural Situation, and the Eye appears confus'd and jumbled together, with a total Loſs of Sight. Other Strokes, Pricks, or Punctures, may happen caſually, or by Deſign, as when an Error is committed in Couching of *Cataracts*; and theſe are ſometimes the Occaſion of the Confuſion, when the Inſtrument penetrates juſt to the *Vitreum*, which it breaks or tears off, and at the ſame Time cleaves to the Cryſtalline, the Tunicle, and the *Uvea*, which changes in ſome Meaſure the Situation of thoſe Parts. The Maſs or Collection of *Pus* within the Eye, when it ulcerates and deſtroys the internal Parts, is ſometimes alſo, tho' rarely, a Cauſe of that Confuſion.

Bleeding being the quickeſt Remedy to prevent or quiet the Inflammation, it muſt be made uſe of directly on the diſaffected Side, repeating as Occaſion ſhall require. At the ſame Time, to cool the Heat in the Eye, take Pidgeons Blood warm, and dip your Compreſs in the ſame, or a Defenſative, with the White of an Egg, Wine, and Oil of Roſes beat up together. Renew this Application from Time to Time during the Uſe of it for three or four Days. If during that Time the Inflammation be great, inſtead of the Wine uſe Plantane or the like Waters with the Defenſative, which continue till the Inflammation is allayed. Afterwards foment the Eye with a Decoction of Wormwood or Hyſſop, Fennil, Camomil, and Melilot Flowers. When the Eye is cleared, drop therein a little Cow or Breaſt Milk, in which ſome Saffron has been infuſed.

Of the burſt or broken Eye called the Rhexis.

WHen the Strokes received upon the Eye are ſo violent, that they do not only bruiſe the internal Parts, as in the former Caſe; but likewiſe break and rend off the *Cornea*, ſo that the Aqueous Humour does not only run out, but alſo the *Cryſtalline* and the *Vitreum*, in ſuch a Manner that the Ball of the Eye is entirely empty; ſo that at laſt the *Uvea* and the *Tunicle* being contuſed and torn away; are ſuppurated. This Malady is beſides one Conſequent of the large Wounds of the Eye made by cutting Inſtruments; and the great Ulcerations of the *Cornea*; ſo that the Ulcerations either begun upon the external Superficies of the Membrane, or were occaſioned by a conſiderable Collection of *Pus* within the Eye.

In this Caſe, Bleeding is the firſt Thing neceſſary, and the ſame Methods as preſcribed before to prevent the Inflammation, and appeaſe the Anguiſh. A Fomentation is then of uſe made with Spirit of Wine, when the Blood is extravaſated in any Quantity, to prevent Corruption and a Gangrene. When it is proper to cleanſe, uſe Honey of Roſes, mix'd with the Yolk of an Egg, and a little Powder of Myrrh and Olibanum, or a good Colliry is made with Myrrh and Aloes, of each half a Dram, Six Grains of Saffron in Powder, and half an Ounce of Honey of Roſes, diſſolved in Four Ounces of Wormwood-water, in which a little Fenugreek Seed has been firſt infuſed, and to the ſame you may add half a Dram of Tutty prepared, and as much Burnt Lead well waſh'd, in order to dry and cicatrize the Wound. If during the Cure there happen to be any fungous or proud Fleſh, eat it off with equal Parts of Burnt Alom, Orrice Root, and Sugar-Candy in Powder, with the following Addition of White Vitriol Six Grains, to render the Medicine more ſearching and drying.

Of the Eye falling entirely *out of the Orbit.*

IT happens ſometimes that by the Stroke of a Stick, a Ball, a Stone, or ſome other Inſtrument of the like Nature, that the Eye is violently hurt; ſo that the Ball is not only contuſed and wounded, and the inward Parts bruiſed and jumbled together, but likewiſe the common Membranes, the Muſcles, and other Parts that tie the Eye faſt, are torn and broke off in ſuch manner, that the Eye-Ball is ſeparated, and tumbles quite out; and ſometimes hangs a little by ſome of the nervous, fleſhy, or membranous Fibres.

When the Ball of the Eye is thus fallen out of the Orbit, which is as yet ſupported by ſome of thoſe Strings I mentioned before, it is ſcarce credible that it can be reſtored, and remain fix'd in the Orbit again. Nevertheleſs ſome Authors have affirmed it in ſome of their Obſervations; among which, I ſhall examine one of *Joſeph Couillard*'s, in his Treatiſe of the principal Operations of Surgery, which is this: *The Sieur* Gillaume Vincent, Goldſmith, *of* Montelimard, *received a Stroke on his Eye with a Tennis-Ball, which was ſo forcible, that it divided all the Circumference of the Eye from its Orbit. I was called in to dreſs it, and found a Relation of his with Sciſſars in his Hand going to cut the Nerves, by Means of which it only hung. I oppoſed that Action, and having returned the Eye to its former Place as quick as I could poſſibly do it, I purſued the Cure, and ſucceeded ſo well, that the Eye was healed without any Diminution of Sight.*

When Obſervations in Practice are related for no other End but Oſtentation, the Circumſtances of thoſe Obſervations for the moſt Part diſcover the Cheat. It is thus that this Author has acted, for when he ſays that he reſtored an Eye, and cured it, that was quite ſeparated from its Orbit, and that one was about to cut the Nerves by Means of which he was ſuſtained, he advances a downright Falſhood, becauſe the Eye could not be in that Condition with the Conjunctives relating to it, being entirely broke and divided, and without the Veſſels which attend that Membrane, and which carry the Nutrition to the anterior Superficies of the Eye, being equally in the ſame Condition, together with the Muſcles and the Veſſels that ſupply it.

Another Abſurdity that this Author advances is, to ſay that the Patient was cured without any Diminution or Loſs of Sight. If the Eye was in the Condition he deſcribes it, ſuppoſing it could be reſtored, the Sight would have been totally loſt; Firſt, becauſe the Optick Nerve could not ſuffer ſuch Violence without having the medullary Subſtance diſordered and confounded, and alſo the Courſe of the Spirits entirely intercepted: And in the Second Place, becauſe ſuch a Stroke could not ſo perfectly divide the Eye from the Circumference of the Orbit, without cauſing at the ſame Time a Confuſion in the internal Parts of the Eye-Ball, although the *Cornea* could reſiſt the Stroke without being broke.

But we find it the Practice of the greateſt Part of our modern Oculiſts to follow the Character of this Author, and to gain a Reputation, advance Stories of Cures that are impoſſible, which they boaſt to have done. I ſhall now return to my Subject, and affirm, that though it is impoſſible when an Eye is ſeparated from its Orbit to reſtore it, yet we ought to cut off the weak Strings or Fibres that ſuſtain it, and ſeparate it entirely as an uſeleſs Member, then fill the Socket with dry Lint, to ſtop the Blood if it flow ſlowly, but if plentifully, then to mix with the Lint Maſtick Powder, Gum Arabick, and Bole Armenick, in equal Parts, which are to ſtop the Blood; and upon them to apply Compreſſes dip'd in the Defenſative of Oil of Roſes, the White of an Egg, Wine and Bole. To prevent the Inflammation, use Bleeding, with *cooling* and *emollient Scraps*.

In the Second or Third Dreſſing, and in the following, uſe a Digeſtive with *Turpentine*, the Yolk of an Egg, and Honey of Roſes, continuing on the Defenſative aforeſaid. And when the *Suppuration* is made, uſe a Digeſtive of *Ariſtolochia* and *Aloes*, and when the Part is ſufficiently mundified, heal up a cicatrize as in other Wounds.

Of Wounds of the Eyes, and their Contuſions.

WOunds in the Eyes, in their own Nature are not mortal, ſince moſt of thoſe that are wounded in thoſe Parts are cured; notwithſtanding they are very ill and dangerous, not only through the Loſs of the Sight, which is ſometimes unavoidable, but for their Troubleſome Symptoms, which we muſt purſue, as *Defluxions*, *Inflammations*, *Pains*, *Watchings*, *Deliriums*, and the like.

Wounds cauſed by pointed Inſtruments, or edged ones, are much eaſier to cure than ſuch as are made by blunt ones, that contuſe or bruiſe the Part. Thoſe that are made betwixt the Ball of the Eye and the Orbit, without hurting the Muſcles or the Nerves, are more readily cured, without being ſubject to a great many Accidents; but when the Muſcles or the Nerves are wounded, or the Eye is drawn more on one Side than the other, or a Paralyſis of the Eye happens, or it forms an Abſceſs, which in the Sequel are frequently very dangerous.

In curing Wounds of the Eyes, we ought to prevent the Defluxion, the Inflammation, and the Pain, which are the moſt common Symptoms that attend them, and which give Birth to others; and this is to be done by Bleeding in the Arm, according to the Nature of the Malady and Strength of the Patient, by a regular Method of Living, frequent Waſhing of the Wound, and other general Remedies propoſed as before, and which will be more largely handled in treating of the *Ophthalmy*. Likewiſe to prevent a Defluxion, Inflammation and Pain, by removing extraneous Bodies, if any are drove or thruſt into the Eye betwixt the Ball and the Eye-lids.

As to the topical Medicines, they are to be regarded as the Wounds are great or ſmall, contus'd or not contus'd, or whether the Wound is in the *Cornea*, or only in the Conjunctives, and has entered the *Orbit*; then drop immediately into the Eye *Pidgeons Blood* freſh from the Wing, Breaſt or Cows Milk hot, which Medicines are the moſt kindly and proper to preſerve the natural Temperature of this Organ, to hinder the Inflammation and the Pain, and to diſpoſe the divided Membranes to unite and heal, by a gentle Suppuration, and to apply upon the Eye Compreſſes dip'd in a Colliry made with Roſe Water and the White of an Egg beat up together, renewing it Five or Six Times a Day. If the Wound penetrate the *Cornea*, take ſpecial Care at every Dreſſing not to ſqueeze the Eye-Ball in opening the Eye, for fear of preſſing out the Aqueous Humour, or making the *Uvea* preſent it ſelf at the Wound; or at the ſame Time, the Wound being too great, leaſt you make the inward Parts break out, or at leſt ſtop the Healing of the Wound.

When the *Cornea* is not opened but by a ſingle Prick, as that of a Thorn, a Needle, or other ſharp-pointed Inſtrument, inſtantly at the very Stroke the Eye ſinks and becomes wrinkled by the flowing out of the Aqueous Humour; and in a Day or two after the Eye appears full again, without any Flux from the Aperture, no more than it does after the Puncture which is made in *Couching the Cataract*, as I have obſerved many Times, it making only a little red Bunch at the Place of the Puncture.

If the Wound ulcerate, and caſt forth a corroſive virulent Sanies, or it becomes putrid or ſtinking, it muſt then be treated as directed in the Chapter of Ulcers, having always Regard to the common Symptoms from other Diſeaſes incident to this Organ; at leaſt that the Wound which penetrates the *Cornea* be not too great, or that it be not angular, the *Uvea* not preſently healed, and that becauſe of the Solidity of the *Cornea*, which makes it that the Sides do not eaſily extend; but when it ulcerates, the Aperture enlarges, ſo that it gives more Room for the *Uvea* to throw it ſelf a-croſs, and to form the *Staphylome*. In this Accident, when we ſee the *Uvea* preſent it ſelf, we muſt have Recourſe to Collyries which have an aſtringent or binding Quality, ſuch as I have mentioned concerning Ulcers, which at the ſame Time may cleanſe by the Addition of *Myrrh* and *Aloes*.

When the Wound which is only in the Conjunctive penetrates the Orbit, and that it opens ſome Veſſels, as thoſe which ſuſtain the Ball of the Eye are very looſe, that they may move the eaſier, that gives Liberty to

the Blood to extravasate betwixt the Ball and the Orbit, sometimes in such Quantities as to tumify all the Parts of the Conjunctive, in such a Manner, that it appears like an eminent Circle about the Ball, and sometimes by the like Means the Ball is push'd forward. It happens likewise sometimes that the Conjunctive is torn or dilacerated by the bruising Instruments that may strike sloping on the Edge of the Orbit, by the Side of the little Angle, by Reason that on that Side the Bones which form the Edge terminate in a sharp and cutting Edge, without which the Skin of the Eye-lids would always be found broken, because being thicker, stronger, and less of the Texture of the Bone, it resists more the Violence of the Stroke. In this Case sometimes the Eye advances very forward out of the Orbit, so that the Muscles are laid bare where the Dilaceration is, so that one would believe the Eye was lost, nevertheless it will heal again, and be restored to its natural Situation, without Danger to the Sight.

If on the contrary the Eye be bruised, as when the Dilaceration be made by some blunt Instrument which was not stop'd by the Edge of the Orbit, as in the former Case, and that it produces some Disorder in the internal Parts; or if the Instrument only hit upon the Side of the Ball, and push it violently to the contrary Side, by which Means the Optick Nerve suffers a great Extension, and the Conjunctive is not found torn off; in these two Cases the Sight is left considerably weaken'd, if not totally lost.

Afterwards, when from some less violent Strokes than the former, or by some internal Cause, the Vessels of the Conjunctive are found broken and open, the Blood flows among the Interstices, and makes the Part red and then livid. When the Extravasation is plentiful, it covers all the White of the Eye, and swells it; when it is less, it covers only a Part, and sometimes is in so little a Quantity, that it forms only a red Spot just about the Vessel from whence it proceeded. And after what Manner soever the Extravasation is made, and according to whatsoever the Quantity of Blood is extravasated. This is called by the *Greeks*, *Hypospagma*, by the *Arabs*, *Tarsen*, and by us, a Black or Blue Eye.

Of the Diseases of the Cornea, *and occasionally of those that form the White of the Eye. First, of the* Ophthalmy, *or Inflammation of the Eye.*

AS the Ophthalmy precedes or follows most of the Diseases which attend the *Cornea*, and the other external Membranes of the Eye, and which is yet reckoned a Symptom of the Number of other Diseases of this Organ; I shall not scruple to treat of this Malady, not as a Symptom only, but as a proper Disease peculiar to the Eye. Some by the *Ophthalmy* understand commonly an Inflammation of the Membranes which form the White of the Eye, which is usually comprehended under the Name of the Principal, which is the Conjunctive. I would not have them believe that this Inflammation always covers the White of the Eye, for it extends it self sometimes over all the external Parts of the Eye and the Eye-lids. When this Inflammation is slight, the Moisture less considerable, and the Pain supportable, it is called *Taraxis*, a Perturbation of the Eye, or a *False Ophthalmy*. When on the other Hand it is stronger, so that the Vessels of the White of the Eye and the *Cornea* are visible and stretch'd out, so that the Pain is violent, this is called a *True Ophthalmy*. If this Inflammation is attended with plentiful Showers of hot Tears, we say it is a moist or humid *Ophthalmy*; and when the Inflammation is so great that the Membranes which form the White of the Eye are bloated, and that the Eye lids, over-stretch'd with Heat and Pain, oftentimes turn back again, and cannot cover the Eye but with great Anguish, which is called the *Chemosis*, or most violent *Ophthalmy*.

If the Inflammations of the other Parts of our Bodies are the Consequents of the Motion of the Blood being obstructed, and the Extravasation which follows from the Faults of that Motion, what need we seek for any other Cause, since this Inflammation is like the Inflammation of the other Parts? As may be observed by the Repletion or Swelling of the Membranes of the Eye and their Vessels, by

their Redneſs, by the Pain attended with tings, and by the great Heat which fol- ws.

The Signs of the *Ophthalmy* are ſo diſtin- ſhable, that they cannot fail of diſcove- g the diſaffected Eye, by looking upon Redneſs and Swelling of the White of Eye, the Tenſion of the little Veſſels, underſtanding the Complaints of the ient touching the Heat and Pain which he s, one may know certainly of the Patient t the external Cauſes are, to tell the Diſ- nce, and to conſider his prevailing Tem- ture, his Age, and Manner of Living, ther with the Air, Diet, and the like. *Ophthalmy* is eaſy to cure when it pro- s from a ſlight external Cauſe, and that e is no great Fulneſs or conſiderable In- perature. On the contrary, it is more ficult to cure when the external Cauſes are lent, the Plenitude is great, and the Blood ails over the natural Conſtitution.

When the Pain is violent, and has been ſo e Time, it is an ill Sign, and we may apprehenſive that the Humour is cor- ding, and may ulcerate the Membranes of Eye, or there may be Puſtules, or an ſcess in the *Cornea*, the Conſequences of ch are ſometimes troubleſome. When *Ophthalmy* is ſymptomatick, it is more ſs eaſy to cure according as the Malady which it is a Symptom is better or worſe. he *Ophthalmy*, when the Tears decreaſe, hat they become gluey, and turn to a redneſs of a good Conſiſtence, it is a that it will end well; but otherwiſe, n the Blear-Eye is dry, rough, uneven, like little Grains, this denotes that the mour is very ſharp, and the Malady will inue. If the Inflammation be ſmall, it be removed with Roſe or Plantane Wa- beat up with the White of an Egg, dip- therein a Compreſs, and applying it our or five Days. To perfect the Cure, render it the more efficacious, add five x Grains of Sugar of Lead in Three ces of the ſaid Water.

Where the Plenitude prevails, make an uation by Bleeding, Bliſtering, Iſſues, or s. When the Body is ſufficiently diſ- ged thereby, if the Caſe continues vio- and rebellious, or is attended with a , uſe Emulſions made of the Cold Seeds in any cooling Decoctions; to which add Syrup of *Nymphea*, or elſe *Julaps* of Succory Water, Lettuce, and Syrup of Lemons or Violets, and Decoctions of the ſame or the like Plants: To which add Spirit of Vitriol or Sulphur, Tartar Vitriolate, Cryſtal, Mineral, and the like. If it is neceſſary afterwards to uſe Apozems, take Roots of Succory, Quick Graſs, Strawberry, and Agrimony, each an Ounce; Leaves of Bugloſs, Pimpernel, of each a Pugil, a Dram of the Cold Seeds, and half as much of Barley; of which make a Decoction in Water for Three Doſes, adding an Ounce of Maidenhair or Violets, and Half a Dram of Cryſtal Mineral, to be taken Night and Morning. Towards the End, Purging may be uſed, to cleanſe the Blood, and prevent a new Inflammation; in which Caſe the following Method is good: Take a due Quantity of the cooling Decoction before, boil in it gently two Drams of Sena, half a Dram of Anniſeed, an Ounce of *Caſſia* extracted from the Cane, half a Dram of Crem of Tartar, and in the expreſs'd Liquor diſſolve an Ounce of Manna, and an Ounce of Syrup of Peach Flowers. If it is neceſſary to purge ſtronger, double the Sena, or add Ten Grains of Jalap Powder, or half as much of the Reſin. Thoſe who are averſe to Potions, may take Six Drams of Caſſia, Three of Catholicon, and a Dram of Rubarb in Powder, made into a Bole, or add Reſin of Jalap or Scammony ſix Grains. Where the Pains are exceſſive, ſome give *Opium*, but it ought to be done prudently, and with Diſcretion, for fear that ſhould condenſe the Spirits too much, thicken the Humours, dry the Membranes of the Eye, and leſſen the Sight.

It happens ſometimes that the Heat is ſo great, particularly when the Eye-lids are inflamed, that the Compreſſes, ſoaked in the Colliries, when applied to the Eye, are preſently dry; ſo that we are obliged to renew them often. In which Caſe, that the Patient may not be too much fatigued, the following Anodine and cooling Cataplaſms may be applied. Take an Ounce and half of the Pulp of the Apple boiled, one Ounce of Mucilage of Quince Seeds made in Roſe Water, the White of an Egg reduced to Water, two or three Spoonfuls of Breaſt Milk, and ten or twelve Grains of Saffron

Pow-

Powder; make them into a Poultis, which ſpread upon a Linen Cloth, and apply to the Eye, or take White Bread Crums, and reduce them to the ſame Conſiſtence with Breaſt Milk or Roſe Water.

When the Pain and Inflammation begin to abate, 'tis a Sign that the Humours do not flow with ſuch Violence upon the Eye, and that the Malady is upon the Declenſion. Then we muſt uſe ſuch Medicines as attenuate and reſolve the Humours, and at the ſame Time have an Aſtringency, to give a Spring to the Fibres, that they may the more eaſily diſcharge thoſe Humours which moiſten them. For this Purpoſe, take equal Parts of Roſe Water, Eyebright, and Celandine, in four Ounces of which infuſe a Pinch of Red Roſes and Fenugreek Seed; ſtrain them, and add ſeven or eight Grains of *Sugar of Lead*, and five or ſix of Camphore. If the lacrimal Ducts are ſo relax'd that the Tears ſpring plentifully without Pain, inſtead of the *Sugar of Lead* put in the ſame Quantity of *White Vitriol*.

I know a great many Practitioners who uſe indifferently, and that without Reaſon in this Caſe, a vaſt Variety of *Colliries*, in which they put Tutty, Verdigreece, *Lapis Calaminaris*, Aloes, Sarcocolla, Frankincenſe, Maſtick, *&c.* The Reaſon of their Error undoubtedly proceeds from this, in that they confound the *Ophthalmy* which does not ſucceed or depend on any other Diſtemper of the Eye with that which is a Conſequent or attends the Ulcers of the *Cornea*, or the Conjunctive, or of thoſe of the Eye-lids, or an habitual Defluxion of ſharp Tears, or of ſome other Diſeaſe already deſcribed; for had they made this Diſtinction, they would not have propoſed theſe Medicines ſo indifferently, or rather promiſcuouſly: But not with ſo much Danger as thoſe who preſcribe *Ægyptiacum*, ſublimate Corroſive, Spirit and Oil of Vitriol, under Pretence of curing the moſt virulent Ulcers, without conſidering that theſe Inflammations are nothing but ſymptomatick, and conſequently the Parts would be ruined and deſtroyed by ſuch violent Means.

Of *the* Oedema, *or* Oedematous D*fluxion of the Conjunctive*, &c.

IT happens ſometimes after the *Ophth* and ſometimes before it, that there conſiderable Defluxion of pituitous H mour upon the Eye, ſo that the Conjunc is raiſed and tumefied but always with the Inflammation. When this happens the Outſide of the Eye-lids, it deſtroys natural Colour, and cauſes an intoleri Itching over all the Eye. As this Mal happens not but to thoſe who are under ill Habit of Body, in order to its Cur good Method of Living muſt be direc with frequent Evacuations to carry off offending Humours which prevails over whole Maſs of Blood, and to alter the u Courſe of Life, firſt by preparing the B with ſuch Apozems or Ptiſans as are p per to remove the Obſtructions which h produced a *Cachexy*; then make Uſe of D ſters, Iſſues, or Setons, as the Emergency the Caſe may require.

As to the particular Remedies for the Re ning of the Eye, let it be waſh'd ten twelve Times a Day with an Eye-Wa made with Roſe and Fennil Water, ſ Ounces, in which infuſe a due Quantity Fenugreek or Linſeed, to render it mucila nous. In the Expreſſion, diſſolve half Dram of Myrrh, and eight Grains of Ca phore, and upon the Eye apply Compre dip'd in the following Fomentations m with Wormwood, Sage and Betony, of e half a Handful; Flowers of Camomil, M lilot, and Red Roſes, of each a Pugil; F nil, Fenugreek, and Aniſeed, of each a Dra boil theſe in a due Quantity of Claret to ply upon the Part. Sometimes this is m more ſpirituous, by adding ſome Spiri Wine, particularly when we find the E lids tumefied and look tranſparent.

Of the Puſtules of the Conjunctive a the Cornea.

THere are Two Sorts of Puſtules comm to the *Conjunctive* and the *Cornea*: Firſt, are little ſuperficial Veſicles full Water, like ſmall Bliſters, raiſed by a Bu Scalding Water, *&c.* vulgarly called *Ph ctenes*; and the others are little Bladders

nours, a little deeper, fill'd with a pu-nt Matter, juſt like the Puſtules that are n the Surface of the Skin. I call theſe ly *Puſtules*, to diſtinguiſh them from *Phlyctenes.*

The *Phlyctenes* and the *Puſtules* generally uch put the Patient in Danger of lo- his Sight, becauſe it is to be feared they degenerate into ugly corroſive Ulcers, ch are always troubleſom in the End. particular, the *Phlyctenes* are not ſo ill as Puſtules, becauſe they are more ſuper-cial, and the Humour which they contain not ſo ſharp: Both Sorts which happen on the *Conjunctive* are not ſo dangerous thoſe which happen upon the *Cornea*; and thoſe which come upon the *Cornea* at the art of the *Iris*, are leſs inconvenient to ci-rize than thoſe which come over-againſt the Apple of the Eye. In ſhort, thoſe that roceed from external Cauſes are leſs trou-bleſome than thoſe that ariſe from internal ones.

The Cure of the *Phlyctenes* and the *Puſtules* is alike; for in the Beginning they are to be treated with the ſame Remedies, becauſe the firſt Intention is to abate the Inflammation. Likewiſe Bleeding is to be uſed, and other general Medicines, as before directed.

Of the Hypopyon *or* Abſceſs *of the* Cornea.

BY the *Hypopyon*, Authors mean Two Things; Firſt, a Maſs of *Pus* behind the *Cornea*, and the ſame in the Eye-Ball. Secondly, a Maſs of *Pus* which is formed in the Interſtices of the *Cornea*. The Firſt, comprehends all the Maſs of *Pus* which comes from the Abſceſs of the internal Parts of the Eye, or from the Blood diffuſed within the Eye, and which ſuppurates. I ſhall confine it to this Extravaſation of *Pus* behind the *Cornea*, according to the Opening of the Abſceſs which is made upon the internal Superficies of that Membrane. So by the *Hypopyon*, I likewiſe mean Two Things; Firſt of all the Maſs of *Pus*, or the Abſceſs, which is made betwixt the Interſtices of the *Cornea*; and in the Second Place, the Extravaſation which is made within the Eye, when the Abſceſs opens inwardly.

This Malady is ſometimes an Attendant or Conſequent of great Inflammations of the Eyes, when they are not carried off by Reſolution. It comes likewiſe from a hot ſharp Blood, which is very thin, and gathers together in ſome ſingle Part of the *Cornea* like other Abſceſſes; and further, it happens after ſome Blood is extravaſated among the Interſtices of the *Cornea* by ſome Stroke, which, inſtead of diſſolving ſuppurates. It differs from the *Phlyctenes* and the *Puſtules*, in that theſe Maladies are not as the internal Superficies of the *Cornea*, and that the Matter which they contain is very fluid, and that it flows among the Pellicles, and that this Matter is much thicker, and very like that of the Abſceſs; ſo the *Hypopyon* is properly an Abſceſs of the *Cornea*. When this Abſceſs is formed, the Inflammation is violent, and the Pains are lively and exquiſite, which continues ſo till the Matter is turned to *Pus*. This Abſceſs is ſometimes ſo little, that it extends it ſelf no larger than a *Puſtule*; and other ſometimes it is ſo large, as to cover a great Part of the *Cornea*. When the *Pus* is collected among the Pellicles of the outward Superficies of the *Cornea*, it forms on the fore Part a Tumour painted like a Cloud. In the Middle, the Tumour is flat and depreſs'd, and amongſt the Pellicles of the internal Superficies, ſometimes there appears not any Tumour at all forwards, the Tumour being within the Eye. When there appears no Tumour forwards, you may judge that the *Pus* is contained among the Pellicles of the tranſparent *Cornea*; then take Notice of the Eye on that Side, and at the ſound Part of the tranſparent *Cornea*, and if the *Iris* and the *Pupilla* appear in their natural Situation, oppoſite to the Collection of Matter, it is a Sign that the Abſceſs is in the *Cornea*. It is more difficult to form a Judgment when it is gathered together towards the internal Superficies of the opaque *Cornea*, and there appears no Tumour on the outſide, having nothing beſide the general Signs to know it by, which are, that the Pain is more violent in that Part, the Inflammation more conſiderable, the Tenſion of the Veſſels greater thereabouts, and the Colour darker in the Middle of the Collection.

When the *Pus* is made clear, it reſts at the Bottom of the tranſparent *Cornea*; and when it

it is in a determinate Quantity, it extends it ſelf, and forms a white Spot. This Spot is much more apparent when the Abſceſs is broke within the Eye, and when the *Pus* flows betwixt the *Iris* and the tranſparent *Cornea*, and makes properly that Kind of *Hypopyon* which the Ancients called the *Onyx*. The Abſceſs of the *Cornea* is a very troubleſome Caſe, ſince the moſt Part of thoſe who labour under it loſe their Sight, either by the Cicatrizes which remain, and are very thick, or by the Ulcer of the *Cornea*, which ſucceeds the Opening of the Abſceſs, and which is almoſt always of a very malignant Nature; or by the Rupture of the ſame Membrane, which is followed by a Flux of the aqueous Humour, which is ſometimes ſo conſiderable, that the internal Parts change their Situation, and are jumbled together; or, in ſhort, by the Suppuration of the whole Eye, or at leaſt of a Part, when the *Pus* which makes its Way inwardly is of an ill Quality. For the Cure of the Abſceſs of the *Cornea*, you ought to begin with the general as well as particular Medicines, already propoſed in the *Ophthalmy*; obſerving alſo what has been ſaid before upon Account of the *Phlyctenes* and the *Puſtules*.

Of Ulcers of the Conjunctive and the Cornea.

THE Ulcers of the Conjunctive and the *Cornea* are the moſt common Diſeaſes that happen to the Eyes. The Inflammation, the Puſtules, the Abſceſs, Wounds, and generally ſpeaking all the Solutions of the Continuity of the Parts, not only occaſion them, but alſo all the Defluxions of ſharp and biting Humours, which are ſeated in the Glands and upon the Eye-lids, produce them. When theſe Humours flow in the Eye, and make any Stay there, they are either ſuperficial or deep: The ſuperficial, which are uſually occaſioned by ſharp acrid Humours, which affect the Glands, and water the Eye, or by the *Phlyctenes*, or ſome other extraneous Bodies of little Conſequence, which enter into the Eye and wound it. Theſe are of Kinds which differ not among themſelves otherwiſe than as to *Major* or *Minor*, as being greater or leſs than one another. The firſt, is a ſlight Ulcer which appears in the Nature of a Miſt, very ſuperficial, upon the tranſparent *Cornea*, and which covers ſometimes the greateſt Part. It is properly nothing at the Beginning but an Ulceration of the upper Skin which covers the *Cornea*, and this Kind of Ulcer is called *Achlys* or *Caligo*, a *Miſt*, or *Fog*, becauſe it appears exactly like one. The Second Sort is an Ulcer like the former, but a little deeper and whiter, which is not ſo largely ſpread; and as in this Ulcer the *Superficies* of the *Cornea* is found ulcerated, it leaves a ſlight Cicatrice after Cure which incommodes the Sight a little when it is found above the *Pupilla*. The Ancients called this *Nephelion Nubecula*, a little Cloud, becauſe it is more opaque than the former, and reſembles a ſmall Cloud. The Third Sort is a round Ulcer, much deeper than the former, which ſometimes ſucceeds the Opening of the Eye-lids, and which appears white when it is upon the tranſparent *Cornea*, and red when it covers the White of the Eye; and when it is found in that Situation which covers at the ſame Time Part of the White of the Eye, and Part of the tranſparent *Cornea*, it appears of two Colours above; that is to ſay, red upon the White of the Eye, and white upon the tranſparent *Cornea*. The Cicatrice which remains after Cure obſtructs the Diſtinction of Objects, when it is oppoſite to the *Pupilla*. Authors call this Ulcer *Ulcus rotundum*, or the round Ulcer, from its Figure, which is more circumſcribed than the former. The Fourth is a burning painful Ulcer, of an Aſh-colour, uneven and rough, looking like a little Lock of Wool when it is upon the tranſparent *Cornea*. It is much the worſt of the ſuperficial Ulcers, being apt to degenerate into a deep ſinking Ulcer. It leaves a much thicker Cicatrice than the former, and is called, by Reaſon of its Heat and Pain, *Epicauma*, *Ulcus inuſtum*, or a *Burning Ulcer*.

All theſe Ulcers being neglected, or happening in an ill Habit of Body, ſubject to frequent Defluxions, degenerate ſometimes into deep Ulcers, which are other ſometimes cauſed by the Opening of the Abſceſs, which is ſeated in the thick of the *Cornea*, by Wounds and other Accidents, which are

nguiſh'd commonly into Three Kinds: The Firſt is a cloſe ſtrait Ulcer, that is deep nd hard in the tranſparent *Cornea*, when it at the Top of the *Iris*, or the *Pupilla*, not ppearing to have changed Colour at all, grown white; but when the Ulcer is ci-atrized, and when it is upon the *opaque rnea* at the White of the Eye, it is very ght in the Circumference, and in the Centre, or Middle, looks black, becauſe the *rnea* is thin at that Part. This is called *ythrion, Foſſula*, a Dimple, or Pit, from its Depth. The Second is an Ulcer like the former, except that it is larger, and not ſo deep, becauſe the *Cornea* being thin, it is puſhed inward from the Ulcer by the aque-ous Humour, occaſioned from the Extenſion of the ſaid Ulcer, called *Cæloma, Cavitas*, or the Hollow. The Third is a ſordid and ſtinking Ulcer, throwing out a thick cor-rupted *Sanies*, which gives it the Name of *Encauma, Ulcus ſordidum*, or a foul Ulcer.

In curing the Ulcers of the Eyes, we muſt endeavour firſt to ſtop the Inflam-mation, if great, by leſſening, abating or repulſing the Humours which produce it, by a good Regimen or Method of Living, Eye-Waters, Bleeding, Bliſtering, Cauteries, and other general Remedies, adminiſtred in Order as I have ſaid before, ſpeaking of the *Ophthalmy*, and the like, according to the Degrees of the Inflammation. As to Parti-culars, if the Ulcer be ſuperficial, and the Inflammation inconſiderable, uſe the follow-ing Water: Take Five Grains of white Vi-triol, Six of Sugar of Lead, Twenty Grains of the white Troches of *Rhaſis*, a Scruple of Sugar-candy, diſſolve them in Three Ounces of Plantain or Roſe-water, in which Ten Grains of Gum *Arabick* has been firſt diſ-ſolved, and waſh the Eye with it Ten or Twelve Times a Day, and apply upon the Eye a Compreſs dipped in a cooling Colliry of Roſe-water and the White of an Egg beat together. Or make another Sort, with Six Grains of Camphire, as much white Vi-triol, and a Scruple of Sugar-candy, diſ-ſolved in a like Quantity of any of the aforeſaid Waters.

Of the Symptoms which ſucceed the Ulcers of the Eyes; and firſt of the Staphyſome.

THE *Staphylome*, or Sinking of the *Uvea*, is a Sort of Tumour divided commonly into Four Kinds, which take their Names from ſuch Things as they are moſt like. The Firſt, which is the principal, and whoſe Baſe is large, and the Superficies roundiſh, reſembles much a Part of a Raiſin-Stone, from thence called *Staphylome*, and is of Two Sorts: The One, when the *Cornea* is thin and relaxed, ſo that the aqueous Hu-mour, which naturally fills with ſome Force the Eye-ball, to maintain its natural Size and Roundneſs, is found to give leſs Re-ſiſtance on that Side, thruſts this Membrane forward, and raiſes a Bunch, which is com-monly of the ſame Colour of the *Cornea*: Likewiſe in the Beginning, when this Mem-brane, is ulcerated beſides, it is of an obſcure Colour, and when it is entirely cicatrized, it is white and ſhining. The Other, when the *Cornea* is wholly broken, and the aque-ous Humour puſhes the *Uvea* athwart from the Rupture, and makes it run into a black round Bunch, which occaſions the Colour of that Membrane.

The Second Kind is, when the *Uvea* is convey'd in ſo large a Quantity as to form a Tumour much bigger and thicker than the former, repreſenting in ſome Manner a ſmall Apple, when the *Staphylome* changes its Name, and is called *Melon, Malum*, an Apple.

The Third Sort is, when the *Uvea* being likewiſe advanced and carried forward, har-dens and contracts it ſelf at the Baſis of the Tumour which it forms, or that the *Cornea* hardens in like Manner, and contracts it ſelf ſo, that the Baſis of the Tumour being very much narrowed, the Tumour appears prominent and round, like the ſpherick Head of a Wedge, ſo that it changes the Name of *Melon* to that of *Helos*, or *Cla-vus*.

The Fourth is, when the Rupture of the *Cornea* is ſo ſmall, that the *Uvea*, which ad-vances forwards, forms a Tumour no big-ger than the Head of a Fly or Ant; upon

which Account it is called *Myocephalon*, and *Formicalis*. All theſe Tumours are frequently found irregular in their Figures, being ſometimes oblong, angular, *&c.* which are purely owing to the different Sizes of the Rupture of the *Cornea*, or to that of the *Uvea*, giving Way in one Place, and reſiſting more in the other. The Three firſt Kinds deſtroy totally the Sight, and occaſion a great Deformity to the Eye. The Fourth Kind does not occaſion ſuch a Deformity on that Part of the Eye which it covers, neither does it totally deſtroy the Sight when it is found in the dark *Cornea*; but when in the tranſparent *Cornea*, it almoſt always does it, or at leaſt conſiderably leſſens it, as well from the Diſorder of the *Uvea*, as the Cicatrice which remains from the Ulcer that precedes it. We may reckon theſe Maladies among the Number of the Incurable, ſince we cannot by any Medicines reſtore the Sight, and what is to be done, is only to ſtop the growing of the Tumours, and prevent, or at beſt leſſen, the Deformity.

The Second Symptom which follows the Ulcers of the Eyes, is the Fiſtula *of the* Cornea.

ANother Symptom which but very rarely ſucceeds the Ulcers of the Eyes, is what, when the *Cornea* is broke, is called the *Fiſtula*. It happens when the Rupture is very narrow, and the Edges become callous, ſo that there remains in the Middle a little round Hole. It is alſo the Conſequent of Wounds made by ſome ſharp pointed Inſtruments, which degenerate into callous Ulcers. What follows this Malady, is, that the aqueous Humour empties it ſelf from Time to Time, and then the Membranes appear ſunk and dry, and as the Humour fills again continually, as I have obſerved already, Two or Three Days after the Eye looks likewiſe full as before; but it reſts not long in that State, for as ſoon as that Humour extends the Ball a little more, it begins to flow again as before.

When the *Fiſtula* is in the opaque *Cornea*, and that the Cicatrice cannot make a large Extenſion from the Circumference, the Patient may diſtinguiſh Objects when the Ball is full, provided there be nothing diſorder'd within the Eye, but not when the aqueous Humour is drained out; and when it is in the tranſparent *Cornea*, the Blindneſs follows almoſt conſtantly in ſome Part or other, becauſe it is impoſſible but that the *Iris* muſt in that Situation, and that beſides the *Cornea* does not loſe its Tranſparency by the Cicatrice of the Ulcer, which occaſions the *Fiſtula*.

The Third Symptom of the Excreſcency of Fleſh.

AS the *Cornea* is a ſolid Membrane, which ſeems to be very little furniſhed with Blood, it is not able to overcome the Ulcers that affect it; the ſame conſequently of Wounds, and Excreſcencies of Fleſh, be they great or little, and which are ſometimes very prominent and fungous, ſometimes very firm, but without Malignity, and other Times ſo malignant that they partake of the Cancer. The Ulcers or Wounds which attend the opaque *Cornea*, are more ſubject to the Excreſcencies of Fleſh, occaſioned by a great Number of Veſſels, which water the Superficies of the Nature of the Membranes which form the White of the Eye: Nevertheleſs Excreſcencies are made ſometimes in the Ulcers of the tranſparent *Cornea*, and ſo when the *Cornea* is broken.

When theſe Excreſcencies are of no great Conſequence, they may be treated with Collyries, that are drying, and a little aſtringent, as thus: Take equal Parts of Sugar-candy, Tutty, and Florentine Orris; if this be too mild, add a little Powder of Burnt Allum, or augment it with white Vitriol calcined. When they ariſe to a prodigious Bulk, they ought to be cut off, and treated as Wounds of the Eyes are.

The largeſt Excreſcence of Fleſh I ever ſaw ſucceed an Ulcer, which was partly in the opaque *Cornea*, and partly in the tranſparent *Cornea*, in the inferior Part of the *Iris*, was in one *Nicholas Noel*, who ſerved as a Trooper Nineteen or Twenty Years. It was ſo conſiderable, that it grew out of the Eyelids like a Muſhroom, which covered all the Eye, and was frightful to look upon. Several Hoſpital Surgeons and others, as

told me, had oftentimes endeavoured to extirpate it by Ligatures, the Sciſſars, and Medicines; but three Weeks or a Month after it would riſe again ſo ſtrong, that it would be in the ſame Condition as before; ſo having judg'd it incurable, he was diſmiſs'd. Being gone Home, he found me out, and ſollicited me to relieve him from the cruel Pains he underwent. Having examined this Excreſcence, and underſtanding it was not cancerous, though a little malignant, I reſolved to eat it away with Eſcharoticks. I applied ſome, but to no Purpoſe, which obliged me to make Uſe of a Powder made with one Part of ſublimate Corroſive, and four Parts of Bread Cruſts well dried, and put a little of it upon the Superficies with my Finger, ſo that I ſaw the Fleſh whiten. I waſh'd the Eye with ophthalmick Water warm, to hinder the Sublimate from diſſolving by the Moiſture of the Excreſcence, ſo as to act upon the neighbouring Parts, and afterwards I applied Compreſſes dip'd in a Collyry made with the White of an Egg and Roſe Water. The Eſchars were made very readily, falling off that Night or the next Morning; being fallen, I applied again the ſame Powder. In four Days all that grew upon the Eye-lids was waſted; then I weaken'd my Powder, by adding more Cruſts of Bread; and when I applied it, I held the Eye-lids open, juſt as far as I would have it act, and waſh'd the Eye as before, ſo as to defend the internal Part of the Eye-lids. The nearer I came to the Root, and the more ſolid the Fleſh was, the greater Pain my Powder occaſioned; nevertheleſs the Eſchars fell off as uſual, and I obſerved there was no Inflammation in the Eye. In three Days more the Excreſcence was found confirmed to the Level of the *Cornea*, and I underſtood that the Baſis did not cover more than half the Size of a little Nail, that the *Cornea* was ulcerated and broke of the ſame Magnitude, and that the Roots of the Excreſcency paſſed on the other Side, and had their Foundation upon the *Uvea*. That obliged me to leave off this Powder, and uſe ſome Means leſs violent; but in Spite of this Practice, the proud Fleſh roſe upon me from one Day to another. I returned then to my former Medicine, to kill entirely all the Roots of the Excreſcence, though the Eye it ſelf was to periſh. After the Second Application, as the Eſchar ſeparated, not only the aqueous Humour poured out, but at the ſame Time the *Cryſtalline* and the *Vitreum* flow'd by the Aperture, and the Eye was empty. All the Pain ceaſed, and the Ulcer cleanſed and healed entirely in five Days Time, by the Uſe of a mundifying and drying Collyry, without the Patient's being at that Time ſenſible of any Pain, tho' continually expos'd to all the Injuries of the external Air.

The Fourth Symptom of the Cicatrice of the Cornea.

WHen the Ulcers or Wounds of the *Cornea* are cured, there remains Cicatrices, the ſame as in other Parts of the Body which has ſuffered any Breach or Diſunion. Theſe Cicatrices in the tranſparent *Cornea* look like white Spots ſpread more or leſs, or elſe thicker or thinner. They are uſually united and ſhining, other ſometimes they are ſunk, and ſometimes a little riſing and uneven. In the opaque *Cornea* they appear but very little, by Reaſon of the white Colour of the Membranes of the Conjunctive. Sometimes likewiſe they appear reddiſh, or a little eminent, and other ſometimes a little obſcure, eſpecially when the Ulcers are ſpread and deep.

Of all the Cicatrices of the *Cornea*, there are none like thoſe upon the tranſparent *Cornea*, oppoſite to the *Pupilla*, which removes or leſſens the Sight; all the reſt produce no Diſadvantage, when there is no Alteration in the natural Diſpoſition of the internal Parts of the Ball. Thoſe which ſucceed the ſuperficial Ulcer appear not but as a little Miſt, which diminiſhes the Sight more or leſs, according as it is more or leſs extended, or thicker or thinner: And thoſe which ſucceed the deep Ulcers, appear like a white ſmooth Horn; and as they deſtroy the Tranſparence of the *Cornea*, they ſtop entirely the Paſſage of the Rays of Light, and that more or leſs, according as they poſſeſs a larger or leſſer Space.

Preſently after the Cure of Ulcers or Wounds, the Cicatrices ſeem to be more extended, by Reaſon of the ſmall Miſt that

ſurrounds them, which not being occaſioned by a Remainder of Humour contained between the *Pellicles* of the *Cornea*, diſperſes it ſelf when this Humour is perfectly diſſolv'd; and then the Cicatrices look not ſo large, but are much leſs, from the Contraction and Dryneſs of the membranous Fibres that are cicatriz'd.

It is an Error to ſuppoſe that the Cicatrices of the *Cornea* can be taken away or defaced by any Medicines, they being abſolutely irremoveable, and continue all one's Life, as Experience ſhows, notwithſtanding all the Promiſes moſt Pretenders make to do it by Medicine; for whoever attempts it, will ſoon acknowledge this Truth. Beſides, it is Folly to imagine to colour or black the Part, ſo as to leſſen the Deformity with Colliries, or a Sort of Ink made with Galls, Pomegranate or Walnut Peel, Vitriol, Litharge, burnt Lead, and other Things of the like Nature. All theſe Remedies on the contrary, with which they pretend to remove or diminiſh the Spots, or at leaſt to paint them over, and which ſome Authors recommend ſo plentifully, are more likely by their Acridneſs or Aſtringency to ulcerate the Parts afreſh, and to render them more difficult.

Of the Eagle, and the Leucoma *or white Spot on the Eye.*

THE Eagle ſo called, is a whitiſh Spot on the White of the Eye, which is produced by a pituitous Humour that is amaſs'd together betwixt the Pellicles of the White of the Eye and the *Cornea*, and which ſometimes forms a Kind of little Tumour; and when this Matter is much harden'd, it forms a Kind of Callofity, wkich is term'd *Poros* or *Poroſis*, a tough hard Knot or Callous.

The *Leucoma*, or *Albugo*, is a deep Cicatrice of the Eyes, or a white Spot upon the tranſparent *Cornea*, cauſed by a groſs cheeſy Matter, which is inſenſibly collected, and glides upon the outward Skin that covers this Membrane, and ſtops the Sight as long as it laſts. Old People and Children, where the Heat is weak, and thoſe who labour under ſlight habitual Defluxions of the Eyes, are ſubject to this Malady; and ſom etimes it is occaſioned by external Cauſes. When this has continued any conſiderable Time, it is ſuppoſed it cannot but ulcerate the *Cornea*, and then after the Cure it leaves a Cloud or Spot never to be removed; or elſe, not continuing long, it commonly leaves but little Signs behind it. Theſe Spots muſt be diſſolv'd or taken otherwiſe away, and cleanſed by acrid and volatile Medicines, or made ſmooth with cauſtick Oils; afterwards waſh'd off with cooling Collyries applied warm, in which dip a Compreſs to bind over the Eye; then cleanſe with a Liquor made of Myrrh, Camphire, and White Vitriol, Honey, and Juice of Fennil. Make a Powder for the ſame Uſe with Orris, Sugar-candy, Myrrh, of each half a Dram, and five Grains of White Vitriol.

Of the Pterygion, *or nervous Caruncle.*

THis is an Excreſcence of membranous Fleſh which commonly begins to take Root at the great Angle of the Eye, and ſtretch inſenſibly in the Nature of a Web upon the Conjunctive, betwixt this Membrane and the upper Skin that covers it, joining to the external Circle of the *Iris*, and ſometimes paſſes over and covers the tranſparent *Cornea*, in ſuch a Manner that it ſtops the Sight.

The Ancients have diſtinguiſhed this into Three Kinds, one whereof is called membranous, becauſe it very nearly reſembles carnous and nervous Membrane; the Second is *adipous*, becauſe it is in ſome Meaſure like Fat coagulated, being much whiter than the former, and likewiſe breaks eaſily when you would ſeparate it; the Third Sort are termed the *Varicous*, or ſuch whoſe Veſſels are ſwell'd and enlarged: This is the moſt troubleſome of all, for the Inflammation, the Exulceration, the Itching, and the Pain which attends it.

This membranous Caruncle, in its Root remains ſometimes in a certain Size, without encreaſing and carrying any Inconvenience along with it, during the Courſe of a Man's Life; tho' ſometimes, upon Occaſion of a new Inflammation, it takes Root afreſh, and grows afterward conſiderably. When it

ung, and of a moderate Size, it may be ed ſometimes by Medicine, or at leaſt n'd, and the Growth ſtop'd; but when is confirm'd, and encreaſes, ſo as that it ins to cover the tranſparent *Cornea*, Ap-lication is of no Uſe, and nothing will do but manual Operation.

The *Adipous Caruncle* is difficult to remove by Operation, becauſe it is very ſubject to break; therefore to come at the Cure of this, it muſt be treated with ſuch external Remedies, eſpecially when ſmall and young, as follows: Make a Collyry with half a Scruple of fine Cryſtal, five Grains of White Vitriol, half a Dram of Florentine Orrice, and a Dram of Sugar-candy, which reduce to fine Powder, and apply a little of it to the Part affected, obſerving to waſh it after with ſome of the Eye-waters already preſcribed. Or elſe take the green Collyry made with a Scruple of Verdegreſe, ſix Grains of *Roman* Vitriol, firſt calcined to a Redneſs, Borax, and Pumice-ſtone, of each twelve Grains, and a Dram of Sugar-candy, which infuſe in four Ounces of Rue and Celandine Water, to which add a little Gum *Arabick*. Of this, pour a few Drops upon the Part five or ſix Times a Day.

As to the *Varicous* Caſe, called by the *Arabs* the *Sebel*, when it is without any Malignity, which is very rare, it may be removed after the ſame Manner as the *Pterygion*. I never performed the Operation but upon Two; the Firſt, after I had extirpated it, I uſed a Powder to ſtop the Blood, made of equal Parts of Gum *Arabick* and Bole, and a Sixth Part of *Colcothar* of *Vitriol*. The next, as the Veſſels were large, to avoid the Flux of Blood, which is always very inconvenient to the Eye, that it might not flow but in a little Quantity, after having ſeparated it from the great Angle, I tied it with the ſame String near the great Angle, and cut it afterwards at the other Extremity, the Ligature falling off five or ſix Days after, and both of them ſucceeded very well.

But when this is attended with Scabs, an inſupportable Itching, Scales, Ulcers, Inflammation, a Flux of acrid Tears, that the Veſſels are thick and hard, red or black, that it riſes high, that the tranſparent *Cornea* is confuſed, the Eye-lids are tumefied, that the Patient is ſenſible of great Pain in the Eye or Eye-lids, or Temples, and that he cannot by any Means ſuffer the Light, when all theſe Things meet together at the ſame Time, or though there ſhould want any one of them, this Operation by no Means ought to be undertaken.

Of Squint Eyes, or Eyes askew.

SOme Authors attribute this Malady, which the *Greeks* call *Strabiſmos*, the *Latins*, *Straboſitas*, or *Squinting*, by which one ſees awry or ſideways, to the *Cryſtalline* growing ſo to be ſituated croſſways, or that it inclines to one Side or the other; others ſuppoſe it to be a Vice of the whole Eye, or that it proceeded from a viciated Imagination of the viſual Spirits; and ſome others attribute it to a Convulſion or Retraction of ſome Muſcles of the Eye. I have placed it nevertheleſs among the Diſeaſes of the *Cornea*, becauſe it is certain that this Diſeaſe proceeds from nothing elſe but an ill Conformation of the tranſparent *Cornea*, which being more turned to one Corner of the Eye or the other, or upwards or downwards, obliges thoſe who labour under this Misfortune to look croſsways or ſideways.

But as it happens very commonly, that thoſe who look athwart at the ſame Time look very near or cloſe, I comprehend alſo, that this Malady is not ſo different from what ſome Authors have diſtinguiſh'd and called *Myopia*, or *Suſcioſitas*, Dim-ſighted, or Purblindneſs, by which they cannot ſee except juſt at the Object; ſince this is properly nothing but one and the ſame Malady, and which depend on the ſame Cauſe, that is the ill Conformation of the *Cornea*.

To ſhow from whence this Vice ariſes: Nothing is more eaſy than to conſider and examine the Eyes of thoſe who are thus affected, and to obſerve, that almoſt all of them have the tranſparent *Cornea* more ſtrutting and bunch'd out than ordinary, with this Difference, that ſome are leſs bunch'd, and others more bunch'd and prominent; and that thoſe who look ſimply near Hand have the tranſparent *Cornea* more viſibly bunch'd or crooked; but the Point of the Prominency is turned a little more to the Side of the Noſe than is uſual in other Men, and

and that thoſe who look athwart or ſideways have the ſame uſually more prominent and bunched; but the Point of the Prominency is turned to the oppoſite Side, and looks in ſome Faſhion aſide the Body, or elſe is turned downward, or looks upward.

This being underſtood, it is eaſy to conceive, that when the Squint Eyes would look as other People do, they are not able to diſtinguiſh any Objects at all; becauſe the little Particles of the Rays of Light, which depart from every little Portion of the Objects which come to the Eyes, meeting with the tranſparent *Cornea* more prominent and bunch'd out, it makes it break more in the Approach from the Perpendicular of its Entry, when it penetrates the Membrane, and enters into the aqueous Humour.

From whence it will follow, that thoſe who look only near at Hand to ſee a ſmall Object, or to read (for Example) in a Book, muſt hold the Book not only very near to the Noſe, but exactly before their Eyes; that thoſe where the Prominency of the tranſparent *Cornea* is turned outwards, are obliged in reading of a Book to hold the Book on one Side, or to turn the Head towards that Side that is oppoſite to the Object that they would ſee; and ſometimes they cannot read but with one Eye, if the Eminence be great, and it be too much turned outwards; that thoſe who have the Prominency of the tranſparent *Cornea* turn'd downwards, are obliged to lift up their Heads, and to hold the Book to the Chin, to enable them to read, and when they walk the Streets, to hold their Noſe up always into the Air. And that thoſe who have the like Prominency turned upwards are obliged to hold the Head downwards, or lift up the Book till it is as high as their Forehead to read, and likewiſe to ſtoop down their Heads to ſee before them when they walk in the Streets; and all this becauſe it is neceſſary that the Object they would ſee diſtinctly ſhould be directed towards the moſt prominent Part of the *Cornea*, that the Rays of Light which ſeparate from the Object may be powerfully carried to the Center of the Tunicle, as I have explained it before: And as Squint-Eyed People have not the Muſcles of their Eyes diſpoſed like those of other Men, ſo they cannot turn their Eyes oppoſite to the Prominency to ſee like other Men, and therefore are forced to ſupply this Defect as I have ſaid.

It follows notwithſtanding, that thoſe who ſquint have the Objects they look upon appear larger to them than other Men, becauſe the Angle by which they ſee, and by which one may judge of the Size of the Object, is more open, occaſioned by the large Bunching of the tranſparent *Cornea*, from whence it comes that moſt ſquinting People write their Letters very ſmall, that theſe in the Night-time ſee better than other Men, and can read by Moon-Light; becauſe the *Cornea* being more prominent, contracts more the Rays of Light, which paſs conſequently in greater Quantities thro' the *Pupilla*, which is more dilated than in thoſe who have the tranſparent *Cornea* of the Eye formed as it ſhould be.

A Treatiſe

A Treatiſe of the Ear, in which the whole Fabrick thereof is deſcribed, and illuſtrated with many new Cuts and Diſcoveries, together with the Uſe of all the Parts interſperſed, with an accurate Deſcription of the Muſcles of the Uvula *and* Larynx. *Taken from a Treatiſe* de Aure Humana, *written by* Antonio Maria Valſalva, *Doctor of Philoſophy and Phyſick, Profeſſor of Anatomy in the Univerſity of* Bononia, *and Chirurgeon to the Hoſpital of* Incurables. *Printed at* Utrecht, 170 .

A Deſcription of the Auricle and Auditory Paſſage, or the external Cavity of the Ear.

THE Ear is divided into Three Cavities, to wit, the External, the Middle, and the Internal. The External comprehends the Auricle and the Auditory Paſſage; the Middle, the *Tympanum* or Drum; and the Internal, the intricate Foldings or Winding of the Ear, called the Labyrinth: Of every one of which in their Order. The Auricle is that Part that is apparent to the Eye, and ſtands out of the Head at the *Os Petroſum*, as may be ſeen *Tab.* I. *Fig.* I. but this Part being ſo well known to every Body, I ſhall not inſiſt upon the particular Deſcription of the external Figure, as thinking it unneceſſary.

The Ear being formed of Prominencies and Cavities, is cloathed with a Skin, which beſides its common Texture abounds with a great many Holes or Pores, eſpecially in thoſe Hollows of the Ear called the *Concha*, the *Scapha*, and the Nameleſs Cavity. Likewiſe in the hinder Part of the *Concha*, juſt to the Hairy Scalp, where theſe open themſelves, the Skin riſes as it were into little Tubercles, which if you ſqueeze, a Matter will iſſue out like ſmall Worms, which being afterward dried, appear upon the Parts as a rugged Scurf, the Nature of which is, when voided, the ſame with that we meet with in the Spine, the Sides of the Noſe, as well as other Parts of the Body, eſpecially under the Eye-lids. Theſe Glands in the Auricle have never yet been obſerved by any, ſo as to be diſtinguiſh'd from others, as falling in the firſt Cavity of the Ear; and the ſecreted Humour that is made there being of the Reſemblance of Tallow, I ſhall call them Tallow Glands. There are beſides ſuch like Glands as theſe in the Hairy Part of the Head, and alſo in ſome other Parts of the Body beſides theſe, as we have Room to conjecture. That Unctuoſity in the Hairy Part of the Head affords Occaſion for Speculation, together with the Scurf that falls from the Head during the Time of combing it. In ſeveral other Parts this appears, as the Neck, the *Scapula*, *&c.* There is likewiſe an adipous Membrane lies under the Skin, which here ſcarce ſeems to deſerve the Name, ſince it ſhows not any Kind of Fat beſides that little which is found at the Lobe of the Auricle, and the lower Part of the *Helix*.

The Skin and adipous Membrane being removed from the *Auricle*, we muſt next take Notice of the Cartilage delineated *Tab.* I. *Fig.* II. From the Conſiſtence of this Prominency, and the Cavity already deſcribed, they are expreſs'd, if the Lobe of the Auricle be received, and the lower Part of the *Helix*, which are made up of the ſimple Duplication of the common Integuments. The ſame Cartilage, to the Middle of the Auricle, towards the lower Part which makes the End of the *Helix*, appears diſunited from the

the *Anthelix* of the other Breaches of the Cartilage, where the ſame is continued from the Riſe of the Auditory Paſſage. Other Things further remarkable are purpoſely omitted, which relate to the Hiſtory of that Paſſage. Beſides, this Cartilage, beyond what has been ſaid of the Prominencies, has a certain Proceſs not as yet taken Notice of by any Anatomiſts, and only obvious to the Eye after a diligent Separation of the Skin, yet not to be omitted in deſcribing the Inſertion of the Ligament underneath. This little Proceſs is acute, and poſited in the fore Part of the Cartilage, where the *Helix* ſhuts the Cavity of the *Concha*, juſt above the Entrance of the Auditory Paſſage.

Above theſe, at the Cartilage upon the Bunching out of the Ear called *Tragus*, towards the Face, certain Glands are diſcovered of which no Mention has yet been made. See *Tab.* I. *Fig.* I. Theſe are about the Size of a ſmall chick Pea, ſometimes of two or three, but moſt frequently of one, and then it is the larger. The Enquiry after them ought to be exactly made, becauſe ſometimes confounded with the *Parotide*, ſtretching it ſelf to the *Tragus*; but this the Eye and a diligent Anatomiſt will clearly diſtinguiſh, being theſe have a different Compoſition and Texture from the *Parotide*.

Beſides the Parts already conſidered in Relation to the *Auricle*, there are Muſcles, ſome of which are joined to one End of the Auricle, lying out of it with the reſt of its Body; the others reach both Ends within the *Auricle*. One of the Externals is the *Superior*, Three from their Situation are called *Poſteriores*, the Diſcovery of which is owing to *Caſſerius*. We have added to them an Anterior, as may be ſeen *Tab.* I. *Fig.* III. The *Superior* Muſcle, which is formed as it were of a ſimple Plan of carneous or fleſhy Fibres, ariſes about the Middle of the Temporal Muſcle. Hence by deſcending and conſtringing together its broad Expanſion in ſome Meaſure, it ſhoots abundance of tendinous Fibres up and down into the upper Part of the *Concha*, and alſo behind the *Scapha*. The *Poſterior* Muſcles of the *Auricle* are ſometimes four and ſometimes two, but moſt frequently three; but when two they ſhow themſelves, and then one is carried with a double Tendon towards the *Concha*. I have ſeen a Variety of theſe Muſcles as to Number, not only in various, but alſo on and the ſame Subject.

There are Three Muſcles very frequently but not a ſimple Maſs of fleſhy Fibres, as ſome of the Moderns have affirmed, inſerted into the hind Parts of the Auricle. Theſe follow one under another, yet in their Beginning as it were one running from the Temporal Bone above the Mammillary Proceſs. At laſt, ſpreading towards the *Auricle* they come with a triple diſtinct Tendon to the poſterior Part of the *Concha*, to which the Middle belongs in its proper Situation where the *Helix* is raiſed from the *Concha*, the other two equally diſtant, are diſpoſed at the Sides. But like as theſe Muſcles vary as I have ſaid in Number, they do not vary ſo much in their Inſertions; for commonly the Fibres of the lateral Muſcles climb up on the Fibres of the middle. Sometimes they proceed in a parallel Order, and ſometimes the Tendons are a little inferior, ſometimes faſtened above the *Concha*: Ariſing from which Differences, has occaſioned the many Opinions of Authors concerning the Number and Poſition of theſe Muſcles; which had not happened had ſo many of the ſame Muſcles been found in different Bodies. For from a Multitude of Obſervations we may diſcover what is perpetual in Nature, what frequent, what indifferent, and what ſeldom. Laſt of all, our *Anterior Muſcle*, ariſing from the Membrane that inveſts the Temporal Muſcle, juſt above the Riſe of the Zygomatick Proceſs from the Temple Bone, is divided into Two Parts, one into the anterior Part of the Superior Cavity of the *Concha*, but the other is fixed a little above into the anterior Part of the Cavity of the *Scapha*. The fleſhy Fibres are ſometimes joined to the external Muſcle from the *Quadratum* of the Neck, being ſpread to the inferior Part of the *Auricle*.

The Deſcription of the external Muſcles will bring us to examine into the internal which nevertheleſs have both their Terminations in the *Auricle*, tho' Anatomiſts hitherto have not diſcovered or known them as they are demonſtrated, *Tab.* I. *Fig.* These Muſcles are Two, and tho' they are ſmall, yet are viſible enough in any Body

hat are not too much emaciated. One of heſe I call *Tragus*, and the other *Antitragus*. The *Tragus* appears externally fraught with eſhy Fibres that circumſcribe it almoſt cirularly. The *Antitragus* Muſcle has its Baſis at the hinder Part of the *Antitragus*, and iſes in Form of a Pyramid, being inſerted nto the Side of the *Concha*, where the *Anhelix* ends. In theſe Muſcles of the *Auricle* the carneous Fibres unite, which recede rom the Gibboſity of the *Concha* about the alf, and extend tranſverſely into the *Anhelix*, where this enlarges the Side of the *Concha*, as may be ſeen *Tab.* I. *Fig.* III. But heſe are more ſenſible in the middle Part han in the upper, ſo that in thoſe they are ſometimes wholly hid.

The *Auricle*, that it may compoſe a continued Cavity with the Auditory Paſſage, and preſerve its due Situation, is firmly tied to the *Os Temporum*; becauſe, beſide the Connexion which it obtains by the external Muſcles, it has membranous Dependencies ſurrounding it, by whoſe Aſſiſtance it remains united to the Bone. Theſe are ſtronger and more diſtinct in the fore Part of the *Auricle* than in the others; for in that, tho' it has not been obſerved by others, there is a certain Ligament very obvious, by which that acute Proceſs is diſcovered in the Cartilage of the *Auricle*, and alſo the upper Part of the Cartilage compoſing the Auditory Paſſage knit to the Temporal Bone, at which Place the Zygomatick Proceſs breaks from it.

The Auditory Paſſage finiſhes the external Cavity of the Ear, delineated *Tab.* III. *Fig.* I. This Duct or Canal begins at the Stricture or Straitning of the *Concha*, and reaches to the Membrane of the *Tympanum*, going croſsways by the *Os Temporum*, ſo that from its vertical Situation, according to its Height, it tends towards the Face. Its Cavity may be compared to an *Elliptic Cylinder*, which does not go ſtrait, but winds with a *Serpentine* Progreſs; for in the Beginning it riſes a little, then about the middle Way it bends backwards with a circular Section, and riſes again; and laſt of all, deſcends in its lower Part at the *Tympanum*, from which in an oblique Section it is cut, ſo as to make with this an obtuſe Angle at the upper and back Part, but an acute one at the lower and fore Part. But that the Configuration of this Cavity may appear clearer, to which End Words are of leſs Importance than Demonſtration, fill the ſaid Cavity with Wax, or any the like Body, ſo that the diſtinct Figure thereof may remain in the concreted Matter, circumſcribing the recluſe Parts of it better than can be expreſs'd in Words, or in Draught.

The cartilaginous Part, and that of the *Os Temporum*, makes Partitions of the Auditory Paſſage, See *Tab.* I. *Fig.* II. and *Tab.* IV. *Letters* F, F. The cartilaginous Part is formed from the narrow Cartilage of the *Concha*, which bowed back towards the Face, and inwardly ſtretched forth, if we meaſure from the *Trago*, makes more than half the Length of the Paſſage in the lower and fore Part; for the bony Part of the ſame Auditory Paſſage ſupplies the upper and back Part correſponding thereto with the *Concha*. This Cartilage is interrupted by cloſe Inciſures, or Gaſhes of the *Meatus* from the membranous Expanſions, as well towards the internal as external Parts: Of which I find Mr. *du Verney* make Mention.

The whole Auditory Paſſage is girt with a Skin, which afterwards becomes the Cloathing of the Auricle, and enters the *Meatus*, and dwindles into a pliable Membrane, but ſo as to be moiſtened with a watry Humour, ſuch as is agreeable to other Membranes of the Body. The Adipous Membrane lying under the Skin enters this Paſſage of Hearing, tho' it is only extended to a Mediocrity, and at its Entrance turns to fleſhy Fibres diſpoſed in a Net-like or Reticular Order. In this Net-work are contained Air Glands, the Delineation of which we have firſt from *Du Verney*. See *Tab.* III. *Fig* II. and III. Theſe are of various Figures, but the greateſt Part of them are either Oval or Spherical, ting'd with a yellow Colour, occaſioned by an Humour contained in their Bladders, which by a conſtant ſqueezing of the fleſhy reticular Fibres, is ſtrained thro' the Pores correſponding to thoſe of the Skin which is in the Cavity of the Auditory Paſſage. By theſe Glandules there is a viſcous Matter ſecerned, which we call the Ear-Wax, which by acquiring too ſolid a Conſiſtence, being copiouſly depoſited about the Drum of the

Ear, called the Membrane of the *Tympanum*, often occaſions a Deafneſs, which, tho' known, not being well underſtood, is difficult to cure.

The external Cavity of the Ear has Blood Veſſels inſerted into it, which convey that Fluid backwards and forwards. See *Tab.* II. It has Arteries from the external Branch of the *Carotides*, which, while it laterally aſcends by the fore Part of the Auricle towards the Temples, and the other upper Parts of the Head, firſt of all beſtows a Branch behind the Auricle, and then other Branches on the fore Part of it, all which not only regard the Auricle, but the Auditory Paſſage. There are Veins accompany all theſe Arteries, except that Twig which aſcends towards the Temples, that is frequently found with an Aſſociate. Beſides all theſe Veins that are ſent to the external Jugular, there is a Vein that carries the Blood back on the hinder Part of the *Auricle*, not yet deſcrib'd by any Body, which I call the Occipital Vein. See *Tab.* VII. *Fig.* II. Since, it takes in ſeveral other Branches from the hinder Parts of the Head, and joins together all the Branches of the ſame into one Trunk.

The Nerves which are diſtinct from a double Origine, are diſtributed by this external Cavity of the Ear. In the firſt Place, a Portion of the Auditory Pair of Nerves, riſing out from *Fallopius*'s Aqueduct, is here divided and ſubdivided; one of which it ſends to the fore Part of the Auricle, the Auditory Paſſage, and the upper Part of the Head; and the reſt are diſtributed thro' all the Parts of the Face; ſo that no diſtinguiſhable Branch of that Part aſcends behind the Ear, which ſome of the Moderns, tho' erroneouſly, have ſuppoſed, and made their Draughts. See *Tab.* II. Beſides, from this is the Branch which ſome burn to abate the Tooth-Ach, but without knowing the Reaſon before this Diſcovery; therefore the Surgeon ought to obſerve to apply the Iron behind the *Antitragus*, and athwart the Auricle, for in that Space he will certainly touch the Nerve.

Beſides the aforeſaid Branchings of Arteries, Veins and Nerves, he will probably meet with Lymphaticks in this Place, which though they have not uſually been found, by Reaſon of the Difficulty in making Obſervations on this Part, nevertheleſs about the *Tragus* I have diſcovered Glands where the Lymphæducts abound, of which Sort I have often obſerved one larger than ordinary under the very Lobe of the *Auricle* in the *Parotides* of a humane Body. *Steno* has taken Notice of ſuch a Gland in a Calf. Likewiſe we may find Lymphæducts in the Auricle and Auditory Paſſage. See *Tab.* I. *Fig.* I.

A Deſcription of the Tympanum, *or Middle Cavity of the Ear.*

FRom an abſolute Deſcription of the external Cavity, I ſhall proceed to the Middle Cavity of the Ear, which immediately ſucceeds the former. That which firſt occurs from thence is, that it is a tranſparent dry Membrane, uſually, though improperly, called the *Tympanum*. This is extended at the End of the *Auditory* Paſſage, ſhutting it obliquely, and making an obtuſe Angle at the upper and back Part, and an acute one at the lower and fore Part: Neither, though it is ſo much ſtretch'd, does it make a right Plane, but in the Middle, towards the inward Parts, it forms a conick Bunch, namely ſuch a one as ariſes from the Protuberancy of the *Malleus*. See this delineated, *Tab.* III. *Fig.* III. and *Tab.* X. *Fig.* I. II.

This Membrane of the *Tympanum* is compoſed of a double different membranous Expanſion, which Compoſition is apparent in a humane *Fœtus*; for the *Dura Mater* enters the Cavity of the *Tympanum* by the Juncture which is betwixt the *Os Temporale* and the *Petroſum*, and expands it ſelf by the ſame Cavity even till it reaches to the ſaid bony Furrow: Here it is joined together, and extended through the whole intermediate annular Space, producing the internal Face of the Tympanick Membrane. This Compoſition being before unknown, to wit, the membranous Expanſions of the *Dura Mater* and the Skin, on which depend the Strength and Firmneſs of the Drum.

Although I allow that the Cavity of the Membrane is ſhut by the Membrane of the *Tympanum*, yet it may be doubted whether it be perviouſly any *Foramen*, or *Pore*, by which either naturally or in a morbous Conſtitution the Fluids of the Body can paſs from

that Cavity into the Auditory Paſſage. So ſmoaking of *Tobacco* paſſing thro' the Ear by the Auditory Paſſage, gives us Room to doubt likewiſe Impoſtumations flowing from the Head by that Paſſage, without any Appearance of the Rupture of the *Tympanum*. I have made ſeveral Tryals to convince my ſelf, but have learned nothing certain from all my Obſervations. Notwithſtanding before I knew any Thing of *Rivinus*'s *Obſervations*, I found a ſmall entire *Foramen* in the Circumference of the *Tympanum*, where the leſſer Proceſs of the *Malleus* riſes towards the Auditory Paſſage; yet, though I often tried after *Rivinus*'s Method to introduce a Hog's Briſtle, that I might penetrate from one Place to the other, I was ſtill doubtful whether it was a true *Foramen*, or whether I had made the Way with the Briſtle. Notwithſtanding this is certain, that the Membrane of the *Tympanum* was leſs tenſe where we ſaw the *Foramen*, and which ſometimes in *Cadavers* or Anatomical Subjects would let ſome Drops of Water flow through; and although the ſtrongeſt Inſpection afterwards was made by *Euſtathius*'s *Tube* into the Cavity of the *Tympanum*, not a Drop of Liquor would be forced through the Auditory Paſſage.

The Cavity of the *Tympanum* reſts upon that Membrane, which together form the middle Cavity of the Ear; therefore the Cavity of the *Tympanum* cut into the *Os Temporale* and *Petroſum*, although by Deſign, makes an irregular Configuration. Notwithſtanding it appears ſpherical in the upper Part, and in the lower Part unequal. The greateſt Part of the interior Superficies being broke by little Hollows, Prominencies, and *Foramina*; it is higher in ſome Places, and in others lower: The higher is but as Three Parts to Two in Reſpect of the leſs. The Length and Breadth is much the ſame, neither of them meaſuring above Four Straw breadths. This and the *Maſtoide Sinus* make a Sort of Cave, communicating with other leſſer *Sinuſſes* of the Mammillary Proceſs, which indeed is a Kind of an Appendix to the finiſhing the Cavity of the *Tympanum*; but in ſome Animals this *Sinus* is wanting, as I have obſerved, and the Cavity it ſelf of the *Tympanum* has been much larger; from hence we may gather, that the *Maſtoide Sinus* is not to be diſtinguiſhed from the Cavity of the *Tympanum*, but added to it, to render it the larger.

What ſucceeds next in this Cavity, are the Four little Bones, the *Malleolus* or *Malleus*, called the Hammer; the *Incus*, reſembling a hollow Grinder or Tooth; the *Os Orbiculare*; and the *Stapes*, or *Stirrop*; delineated *Tab.* III. *Fig.* XI. and *Tab.* IX. *Fig.* I. The *Malleus*, for the chief Part, ſticks lengthways ſo to the Membrane of the *Tympanum*, as drawing inwardly to its Centre. It is a very thin Bone, ſcarce exceeding three Straw Breadths in Length. On the upper Part, joined to the *Incus*, it is thicker, and this is called the Head of the *Malleus*; but the other Part, united with the Membrane of the *Tympanum*, is thinner. This is called the *Manubrium*, which is divided into three Proceſſes. See *Tab.* III. *Fig.* IV. and VII.

The little Bone of the *Malleus* is furniſh'd with Three Muſcles, every one of which, that I may avoid Confuſion and Circumlocution, I ſhall name from that Proceſs into which they are inſerted. So one is called the Muſcle of the great Proceſs, the next the leſſer Proceſs, and the third the Muſcle of the leaſt Proceſs. See *Tab.* III. *Fig.* V. The Muſcle of the great Proceſs, whoſe Diſcovery is due to *Euſtathius*, is the largeſt Muſcle of the *Malleus*, and is contained in a certain bony Channel, running upon a bony Part of *Euſtathius*'s *Tube*, delineated *Tab.* III. *Fig.* XIV. and inſerts its extreme Fibres into *Euſtathius*'s *Tube*, to which it firmly adheres lengthways; and the Inſertion of this Muſcle as deſcribed, tho' it contributes largely to the Hearing, as we ſhall ſhow in its proper Place, was unknown hitherto.

This Muſcle therefore aſcending by that Channel from *Euſtathius*'s *Tube*, proceeds from thence into the Cavity of the *Tympanum*. This bending a little obliquely backwards from its Tendon, is implanted into the largeſt Proceſs of the *Malleus*, betwixt the leſſer and the leaſt of all, but a little below, ſo that the Membrane of the *Tympanum* adheres to that Proceſs as it ſtretches towards the inward Part of the *Tympanum*.

The Muſcle of the leſſer Proceſs, ariſing by a certain Courſe from the Membrane that inveſts the upper Part of the Auditory

Paſſage, is conveyed above the *Tympanum*, and lying parallel with the larger Proceſs of the *Incus*, is fix'd into the leſſer Proceſs of the *Malleus*, delineated *Tab.* III. *Fig.* V.

The Muſcle of the leaſt Proceſs, beginning from the Partition of the *Tympanum* towards the Face, and going thus forward, then being turn'd back, and running under the Line of the *Tympanum*, becomes inſerted into that Part of the *Malleus*, which is as it were oppoſite to the Inſertion of the former, to wit, into the leaſt Proceſs; and ſo the *Malleus* being tied on both Sides, by this Means and that of the former Muſcle, is maintained, but not ſo as to be immoveable, but to aſſiſt it, as a Roller or Leaver, in its proper Motions. See *Tab.* III. *Fig.* V. and *Tab.* X. *Fig.* I.

To the *Malleus* already deſcribed, there is another little Bone annex'd, call'd the *Incus*, which is divided into three Parts, to wit, a Body, and two Branches or Proceſſes. The Body is about a Quarter of an Inch long, a Straw breadth broad, and half that Meaſure in Thickneſs. The ſame Body is interrupted in the oppoſite by the ſmall protuberant Proceſſes and Cavities, from which, by the Intervention of the little Ligaments, it has a motionleſs Articulation with the *Malleus*. See *Tab.* III. *Fig.* VI. and VII. and *Tab.* IX. *Fig.* I. Of the Proceſſes, one is thinner and longer, and recedes about a Straw Breadth from the Body of the *Incus* in the ſame Parallel; but plac'd higher when extended with the Shaft of the *Malleus*, yet in its crooked Extremity turning backwards towards the *Stapes*. The other Proceſs is thicker and ſhorter, and in its Extremity, by the Partition of the *Maſtoide Sinus*, in which it is placed together, is hid with the Body of the *Incus*, and the Head of the *Malleus*. It is united by a ſhort thin Ligament, yet not ſo as to render it motionleſs, but to aſſiſt the Motion at the Place where it forms the Juncture.

In the Extremity of the long Proceſs of the *Incus*, firſt taught by *F. Sylvius*, the leaſt Bone of all is obſervable, tho' improperly called from its Figure, *Os Orbiculare*, when it rather ſhows a depreſs'd Oval Configuration. See *Tab.* III. *Fig.* VI. and VII. and *Tab.* IX. *&c.* It is ſcarce half as big as a Millet Seed, being placed in the Proceſs of the *Incus*, and the Top of the *Stapes*, but chiefly adheres to the firſt.

The laſt of the little Bones, if we have Regard to the Situation, is the *Stapes* or *Stirrop*, which is juſtly ſo called, ſince it exactly reſembles a Horſeman's *Stirrop*, as is delineated *Tab.* III. *Fig.* VIII. IX. XI. and *Tab.* IX. *Fig.* I. II. III. for it conſiſts of a *Baſis* and two Sides, ending in a little Head, altogether made up of a fine ſlender Subſtance, the Figure of the Baſis of the Stirrop reſembling an Elliptick, although on one Part it wants the Edge or Border. It is gibbous or bunching towards the Entrance of the Labyrinth, but hollow towards the Proceſs of the Stirrop it ſelf: Neither is it pervious with the ſmalleſt Pores, as ſome have taught, but abounds with ſeveral ſmall Spaces, wherein the Bone is ſo thin, that it is tranſparent by an oppoſite Light.

There are two *Foramina* at the upper Part of the *Tympanum*, one of which is called *Feneſtra Ovalis*; the other, *Feneſtra Rotunda*. The *Feneſtra Ovalis* is that which is ſhut by the Baſis of the *Stirrop*, anſwering to its Figure, and gains a Situation parallel to the Membrane of the *Tympanum*. See the Draught, *Tab.* VIII. *Fig.* IV. and V. By this it has a Paſſage to the Entrance of the Labyrinth, for this opens it ſelf into the lower Part. The *Feneſtra Rotunda* has an uncertain Figure, but moſt commonly tends to a circular one, as may be ſeen *Tab.* VI. *Fig.* IV. and *Tab.* IX. *Fig.* II. This is placed ſomething lower than the *Ovalis*, towards the *Occiput*, in that Situation, in reſpect of the Plane of the *Tympanum*, not parallel, but vertical.

Beſides theſe two *Foramina*, known to every Body, I ſhall take Notice of certain new ones in the *Tympanum*, which hitherto have not been ſufficiently diſcovered, and earneſtly deſired, by the ſtudious Enquirers into Anatomy. I mean the Paſſage by which the Blood or Serum may paſs, as we ſee often in extraordinary Caſes, from the Cavity of the *Cranium* into the Cavity of the Ear. Likewiſe thoſe *Foramina* preſently mentioned Communication with the Cavity of the *Skull*. Theſe are towards the upper Part of the *Maſtoide Sinus*, to wit, in that Part of it where it is diſtinguiſh'd from the Cavity of the *Cranium*, directly upon

where the *Malleus* articulates with the ; nevertheleſs it does it alternately up- hat of the *Tympanum*. The Number of Cavities are very irregular, for ſome- there is one, ſometimes two, and ſome- we meet with three.

There is a certain Channel derived from Cavity of the *Tympanum* upon the Ex- nity of the Palate, whoſe neceſſary ſilence *Ariſtotle* firſt underſtood, but whoſe Deſcription is delivered by that incompara- Anatomiſt *Euſtathius*, after whom it is ſervedly called *Euſtathius*'s Tube. This roceeds from the inferior Part of the *Tym-* *num*, on that Side the Membrane which is owards the Face; but ſo that its Orifice or Beginning is placed as it were upright, thence ried obliquely backwards, even to the Proceſs of the internal Wing of the *Pteryg-* *oide* or *Spheroide* Bone, at the Sides of the nward *Foramina* of the Noſe, terminating upon the *Baſis* of the *Uvulæ*. See *Tab.* III. *Fig.* III. and *Tab.* IV. *Let. K, K, K, K.* and *Tab.* IX. *Fig.* I. II.

This Tube is compoſed of a bony, mem- branous, cartilaginous, and fleſhy Part, *Tab.* III. *Fig.* XIV. *Tab.* IV. *Tab.* IX. *Fig.* I. II. The bony Part is a Continuation of the Bone in which the Cavity of the *Tympanum* is contained; and that ſo lengthen'd, that it makes a Third Part and more of the Length of the Tube. This is cloathed with the ſame Membrane that the Cavity of the *Tympanum* is, which being ſtretched, ſerves for a Lining for the whole Tube, yet ſen- ſibly acquires a different Diſpoſition, where it exceeds the bony Part of the *Tube*. *Tab.* III. *Fig.* XIV. for here it grows thicker by its glandulous Subſtance, and the many *Fo- ramina* that appear pervious in it. Beſides, this glandulous Subſtance is thicker, and the *Foramina* more numerous and larger towards the End of the Tube, at which Place the ſame Membrane is continued to the internal Mem- brane of the Noſtrils. The cartilaginous Part compoſes the upper Part of the re- maining Tube, and alſo both the Sides; but the back Side is larger than the fore Side. Laſtly, we ſhall ſpeak of the carne- ous or muſcular Part, which is an Aſſertion entirely new in Anatomy, and which no- thing but hard Labour and Induſtry could have brought to Light. This new Muſcle has carneous Fibres from the fore Side of *Euſtathius*'s Tube, from the membranous Part of the ſame, and alſo from the continued utmoſt Margine of the cartilaginous Part, thro' all that Space which paſſes betwixt the End of the Tube and the oſſeous Part there- of. Hence deſcending obliquely, and met together, they make a Tendon, running by the lower Part of the internal Wing of the *Pterigoide* Proceſs; but after they have form'd this Tendon, and paſs'd by the aforeſaid Part, the deſcending tendinous Parts diffuſe themſelves about the lower Side of the in- ternal *Foramina* of the Noſe, in which Mem- brane they end. Therefore, from the De- ſcription of this Muſcle, if the Inſertions of the extream Parts are regarded, it is plain they cannot better be done than by dilating the two Parts with which it is joined, to wit, the Tube of *Euſtathius*, and the Extre- mity of the inward *Foramina* of the Noſe, which is viſible enough to the naked Eye; for if that Muſcle be ſlightly drawn with the Fingers, then the internal *Foramina* of the Noſe, and *Euſtathius* his Tubes, are di- lated.

A Deſcription of the Labyrinth or in- ward Cavity of the Ear.

THE *Feneſtra* which are met with in the Cavity of the *Tympanum*, to wit, the *Ovalis* and the *Rotunda*, open a Paſſage into the inward Cavity of the Ear; but this, in that Part of the Bone of the Temples which is called from its extraordinary Hardneſs the *Os Petroſum*, is ſo hollowed as to make Room for the Cavity of the *Tympanum*. The Name of the *Labyrinth* has been given to this Part from the Nature of the Thing, as abounding with Windings and Turnings, and ſo Mr. *Du Verney* calls it, and likewiſe divides the ſame Cavity into Three Parts, *viz.* the *Veſtibulum*, or Entrance, the *Canales ſemicirculares*, the ſemicircular Channels, and the *Cochlea*.

The *Veſtibulum* is a Cavity made up of an irregular Configuration, ſhowing on all Sides its concave Partitions, whoſe Length and Breadth are not much above two Straw Breadths, and the Height ſcarce one. It has its Situation juſt above the Baſis of the

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Stapes, betwixt the ſemicircular Channels and the *Cochlea*, having the firſt from the external Part rather, which has Regard to the Auricle, and the other from the internal or oppoſite Part. See *Tab.* VIII. *Fig.* II. and V. and *Tab.* IX. *Fig.* I. and II. In this Cavity ſeveral Orifices are opened, to wit, the Orifice of the *Feneſtra Qvalis*, five Orifices of the ſemicircular Channels, the Orifice of the *Cochlea*, and five Orifices giving Paſſage to the Nerves, and cloſed by them, delineated, *Tab.* VIII. *Fig.* I. II. and V. and *Tab.* IX. *Fig.* I. II.

The Second Diviſion of the Labyrinth takes in the ſemicircular Channels, called ſo from their Form, becauſe each is bent in a ſemicircular Manner: Theſe are in Number Three, each diſtinguiſh'd by a different Name, to avoid Confuſion; which, according to this Author, is done into *Major*, *Minor*, and *Minimus*. The *Canalis Major* has a Communication with the *Veſtibulum* by two Orifices, the one proper, and the other common; the firſt opens betwixt the Orifice of the *Cochlea* and one of the Orifices of the leaſt Channel; but the common Orifice is nothing elſe but the Extremity of the common Channel, which opens in the upper Part of the *Veſtibulum*,

The ſemicircular Channel, called by ſome the *Superior*, I call the Leſs, becauſe it is not ſo long as the former. This, which looks towards the Face, is placed upon the *Veſtibulum*, with which it has a double Communication; one by the common Orifice, the other by the proper, as deſcribed before. It makes an Elliptick Figure, and opens juſt upon one of the Orifices of the leaſt Channel, though not directly, but laterally, to the *Feneſtra Ovalis*; but directly oppoſite to the Orifice of the *Cochlea*.

The *Minimus* or leaſt Channel is poſited betwixt the two former, regarding the external Parts of the Ear, and is ſhorter than the other two. This Channel communicates with the *Veſtibulum* by two Orifices; one ſtraiter, and the other broader: The cloſer Orifice is ſituated betwixt the common Orifice and the proper Orifice of the great Channel, that it may in ſome Meaſure have Relation to the Orifice of the *Cochlea*, and the *Feneſtra Ovalis*. This is circular, and the leaſt of the ſemicircular Channels.

The *Cochlea* is the Third Part of the Labyrinth, which is placed below the ſemicircular Channels, lying betwixt the *Veſtibulum* and that. It nearly reſembles a Shell-Snail, from whence it takes its Name. The *Cochlea* is formed from the Channel which they call the *Modiolum* or Gimblet, running round and dividing in the Middle this Channel into Two others. For the Firſt, the bony Partitions of the *Sinus*, by which the ſoft Portion of the Auditory Nerve belonging to the *Cochlea*, are ſo diſpoſed as to make the *Modiolum*, or rather a Cone, having the Baſis towards the Cavity of the *Cranium*, and the Top towards the *Tympanum*. See *Tab.* VIII. *Fig.* II. and IV. Therefore a this Cone ſpirally turned round, demonſtrates this Channel ſo, that it makes two Circuits and a half; but whether this Cavity is *Ellyptical* or *Cylindrical*, is diſputable. The Superficies of this Cavity is not made of the ſame Subſtance as the Superficies of the Cavity of the ſemicircular Channels.

The *Septum* or Partition that divided the *Canalis Cochlea* into two, conſiſts of a double Subſtance; the one ſolid, the other ſoft. The ſolider Subſtance has a certain *Medium* betwixt a membranous and cartilaginous Conſiſtence, eaſy to crumble, eſpecially in a dry Air, proceeding from that Partition of the *Canalis* which ſticks to the *Modiolus*, and extended half the Height, and this Body ſhows the *Lamina* of the Spiral. But the ſofter Subſtance is a certain tranſparent Membrane continued to the foregoing *Lamina*. See *Tab.* VIII. *Fig.* VII. VIII. IX. and *Tab.* IX. *Fig.* III. We have diſcover'd two Channels into which the *Cochlea* is divided by the *Septum*, called *Scalæ*, or Ladders; one of which belongs to the *Tympanum*, by Means of the *Feneſtra rotunda*; this is called the *Scala Tympani*: But the other has Communication with the *Veſtibulum* by the Orifice ſituated at the Side of the *Feneſtra Ovalis*, betwixt this and the proper Orifice of the *Canalis Majoris*, and this is called the *Scala Veſtibuli*, delineated *Tab.* VIII. *Fig.* V. VI.

To actuate and enlarge the Cavities of the *Labyrinth* by a peculiar Conformation of Parts, the ſoft Portion of the Pair of Auditory Nerves contributes; for the hard Portion of the ſame belongs not to the *Labyrinth*, but

the *Tympanum*, and other known Parts: that we may better underſtand the Pro- of thoſe Nerves, I think it neceſſary ſcribe the bony Channel thro' which paſs. In the Temporal Bone and the *ſum* the Channel of the *Auditory Nerves* llowed, which, not without Reaſon, is tioned into two, to wit, the Common, Particular. The Common is broader the Particular, the Particular longer the Common. The Common is car- obliquely from the Cavity of the *Cra-* towards the *Veſtibulum*, and at the End ided into three little Sinuſſes, one of ich deſcends a little towards the Centre the *Cochlea*; but two others are hollowed ards the *Veſtibulum*, in one of which rge *Foramen* is obſerved, which is the Be- ning of the particular Channel, that is lled by *Fallopius* the *Aquæduct*, and after- ds repeated by *Schelhammer*.

By theſe deſcrib'd Cannels, both Portions of the Auditory Nerves are conveyed, each of which, though they ſeem to have a ſin- le Trunk, yet upon more diligent Inſpe- ction about the Riſe of them, they are found to be compoſed of ſeveral little Cords. Theſe therefore, after they retire from that part of the Brain for a little Time from whence they went out, enter the common Channel, by which, where the *Portio Dura* paſſes near that *Foramen* which is the Begin- ning of the particular Channel, it turns back, running under that Channel, through both Parts of which it runs out. For this goes forward into the Cavity of the *Cranium*, by the *Dura Mater*, and alſo extends it ſelf by the Trunk of the Fifth Pair of Nerves with its ſpreading Branches; but that pro- ceeds towards the *Tympanum* to that Place where it ſends its Twigs already deſcribed, and receives two Branches from what we call the Fifth Conjugation, to the *Foramen* that opens betwixt the Styliform and Mam- millary Proceſs. See *Tab.* VII. Fig. III. *Tab.* VIII. *Fig.* XI.

The *Portio Mollis*, or ſoft Part, in Oppo- ſition to the *Portio Dura*, is divided at the End of the common Channel into two Parts, by which it has Regard to the *Labyrinth*; by one namely, when it inſinuates into the hollow'd *Sinus*, towards the Centre of the *Cochlea*, and the *Cochlea* it ſelf; other- wiſe, when it ſeizes the engraven *Sinuſſes* to- wards the *Veſtibulum* in the very Part, and alſo in the ſemicircular Channels. That we may proſecute this Second Part of the *Portio Mollis*, we ought to underſtand, that the *Sinuſſes* hollowed towards the *Veſtibulum* are not only perforable by Three, as has been taught, but Five *Foramina*, in that Part of the *Veſtibulum* which is oppoſite to the ſemi- circular Channel, to wit, above the Orifice of the Ladder of the *Veſtibulum*. Therefore this *Portio Mollis* is divided into Five Bran- ches, and thoſe ſend forth Five *Foramina* in- to the *Veſtibulum*, which, aſſoon as they are entered, are wont to unite into a certain thin *Membrane*, called the Membrane of the *Veſtibulum*, delineated *Tab.* VIII. *Fig.* II.

Five nerveous Branches being thus dilated into a membrane in the *Veſtibulum*, ſeveral other Membranes go from them, each of which enter into a different Orifice of the ſemicircular Channels; but where a Mem- brane enters by one Orifice of the Channel, and another by another, both make one con- tinued Membrane, ſo as to reſemble a Gir- dle, deſign'd as a proper Senſory for receiving the Motions of Sound, therefore called the *Zones* of Sounds, being Three in Num- ber, as the Channels, and with them obtain the ſame Length; but their Breadth is very ſmall, ſcarce being above that of a Straw. See *Tab.* VIII. *Fig.* VIII. IX. X. Likewiſe, *Tab.* IX. *Fig.* III.

In the Nerves that are deſcribed in the Labyrinth, there are Blood-Veſſels, together with Lymphaticks, for they are obſerved to paſs from the Brain together with the Trunks of the Nerves towards the Laby- rinth; the Progreſs of which, though they are not frequently ſeen, it is not improba- ble but theſe Veſſels, in accompanying the Nerves, water the Zones of the Channels and the *Cochlea*; which Aſſertion, Obſerva- tion confirms in the Expanſion of theſe with the Optick Nerves into the Tunicle of the Eye, as the Author diſcovered in examining the Eye of an Ox. The Parts hitherto taken Notice of in the internal Cavity of the Ear, namely, the *Veſtibulum*, the *ſemicircular Chan- nels*, and the *Cochlea*, together with the Mem- brane of the *Veſtibulum*, and the Zones for Sounds, have the ſame proportionable Di- menſions in Infants as grown Perſons.

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Beſides all this, there is a certain Aqueous Humour in the Labyrinth that is found to moiſten that Part, whereby the Membranes are kept humid, and in a *Fœtus* this appears to be ting'd with a bloody Dye, this Colour ſenſibly vaniſhes in a little and it looks like a limpid Water or Fluid that moiſtens the Breaſt and Belly.

Explanation of the following FIGURES, wherein the Reader is deſired obſerve, that in the Draughts of the Ear here explained, they all deſign'd for the Right Ear to prevent Confuſion.

Tab. I. Fig. I. *Shows the* Auricle, *with the new Gland* Tragus; *to which added, the* Parotide Gland, *with its* Duct, *and the* Lymphatick, *of which have not been delineated before this Author's Work.*

A, A, A. The *Helix*, or whole Extent of the *Auricle* outwards.
B, B, B. The *Anthelix*, or inward Protuberance anſwering to it.
C. The *Antitragus*, the Ridge oppoſite to the *Tragus*.
D. The little Protuberance of the Side next the Face.
E. The Lobe of the Auricle.
F, F. The nameleſs Cavity, term'd *Cavitas innominata.*
G. The *Scapha.*
H, H. The *Concha*, as it appears diſtinct two Cavities.
I, I. The *Parotide Gland.*
K. The Gland of the *Tragus.*
L. The *Lymphatick Gland*, obſerved frequently in the *Parotide.*
M, M. The *Parotide* Duct.
N. The Orifice of the Duct, opening the Cavity of the Mouth, with its Tunicle.

Fig. II. *Demonſtrates the* Auricle *and the Cartilage, with the Inciſions of Auditory Paſſage*, &c.

A, A, A. The Cartilage of the Auricle.
B, B. The Cartilage of the Auditory Paſſage.
C, C. The Inciſions.
D. A ſharp Proceſs of the Cartilage of the *Auricle.*
E. That Part of the ſame Cartilage which to the Extremity of the *Helix*, is diſtinct from the remaining Cartilage of the Auricle.

Fig. III. *Shows the external Muſcles of the* Auricle, *as well ſuch as have been deſcribed by others, as what have been added by the Author.*

A. The ſuperior Muſcle.
B, B. The *Helix* depreſs'd towards the fore Part, that the poſterior Muſcles and the tranſverſe Fibres may be better ſeen.
C, C, C. The poſterior Muſcles.
D, D. The tranſverſe carneous Fibres deſcrib'd by the Author.
E. The Author's Anterior Muſcle.

Fig.

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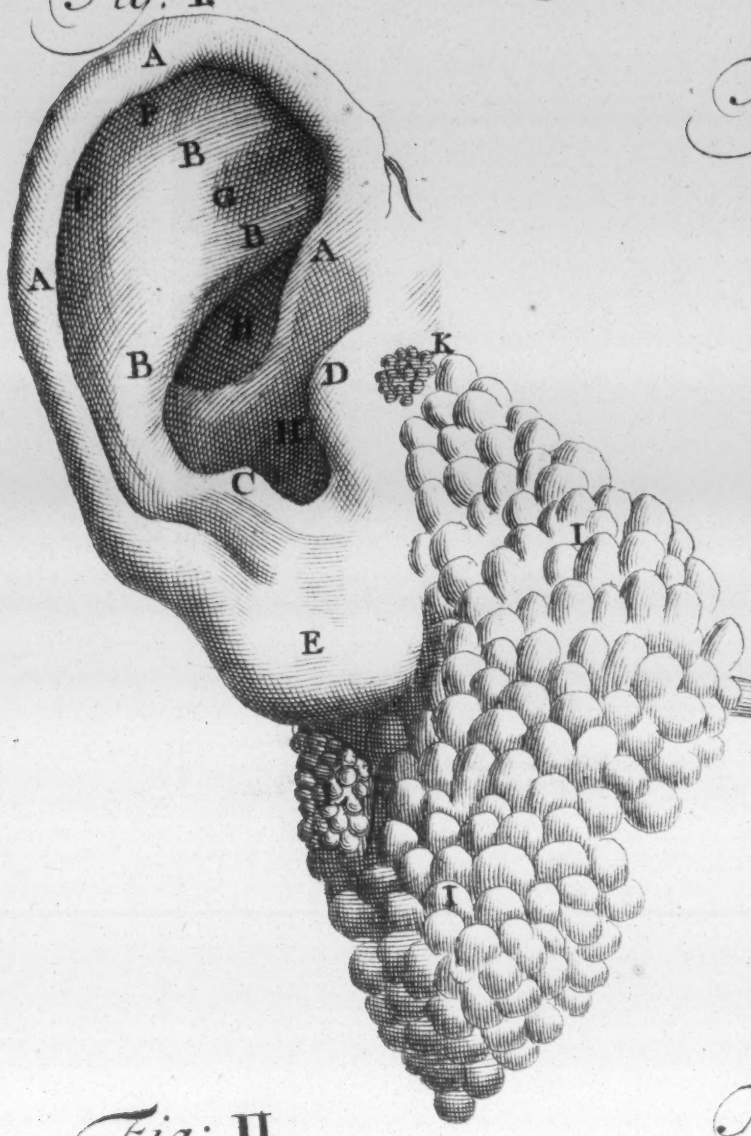

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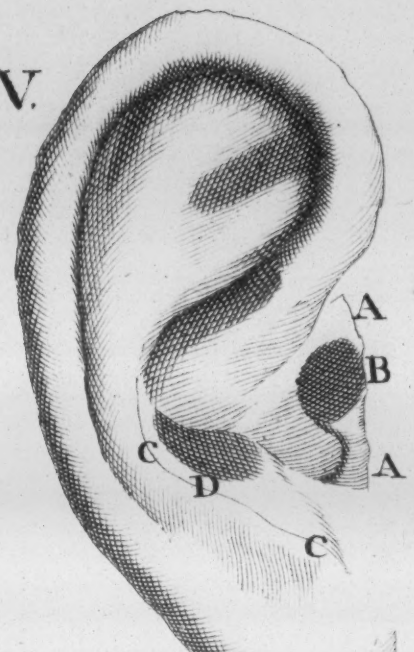

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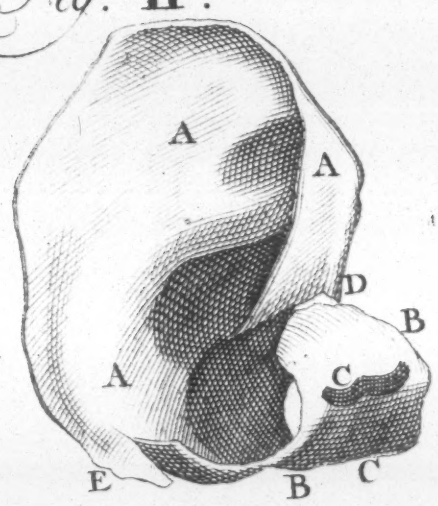

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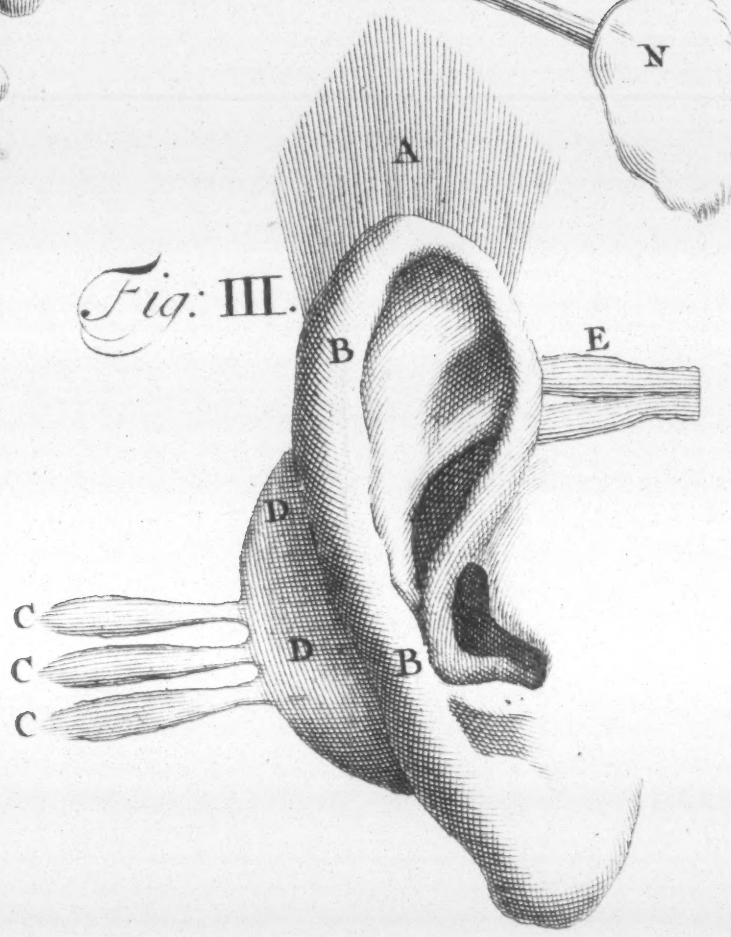

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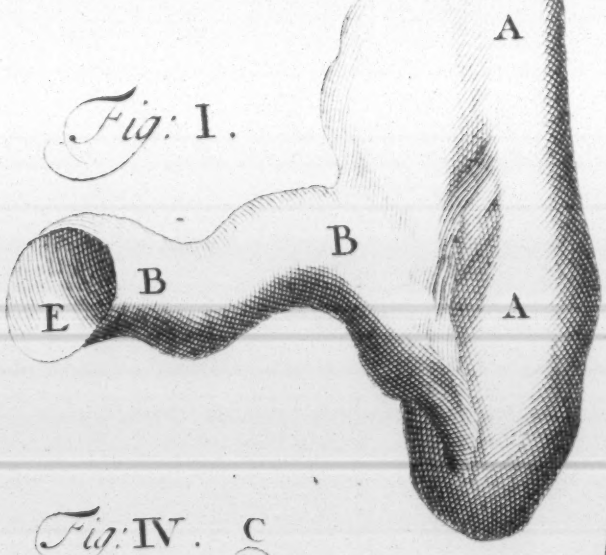

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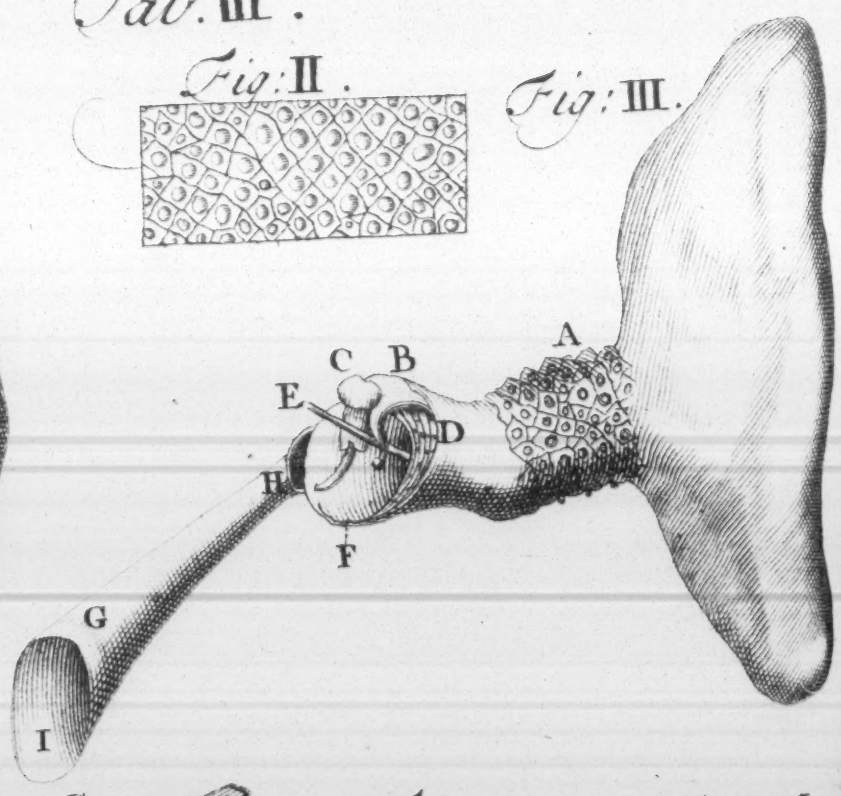

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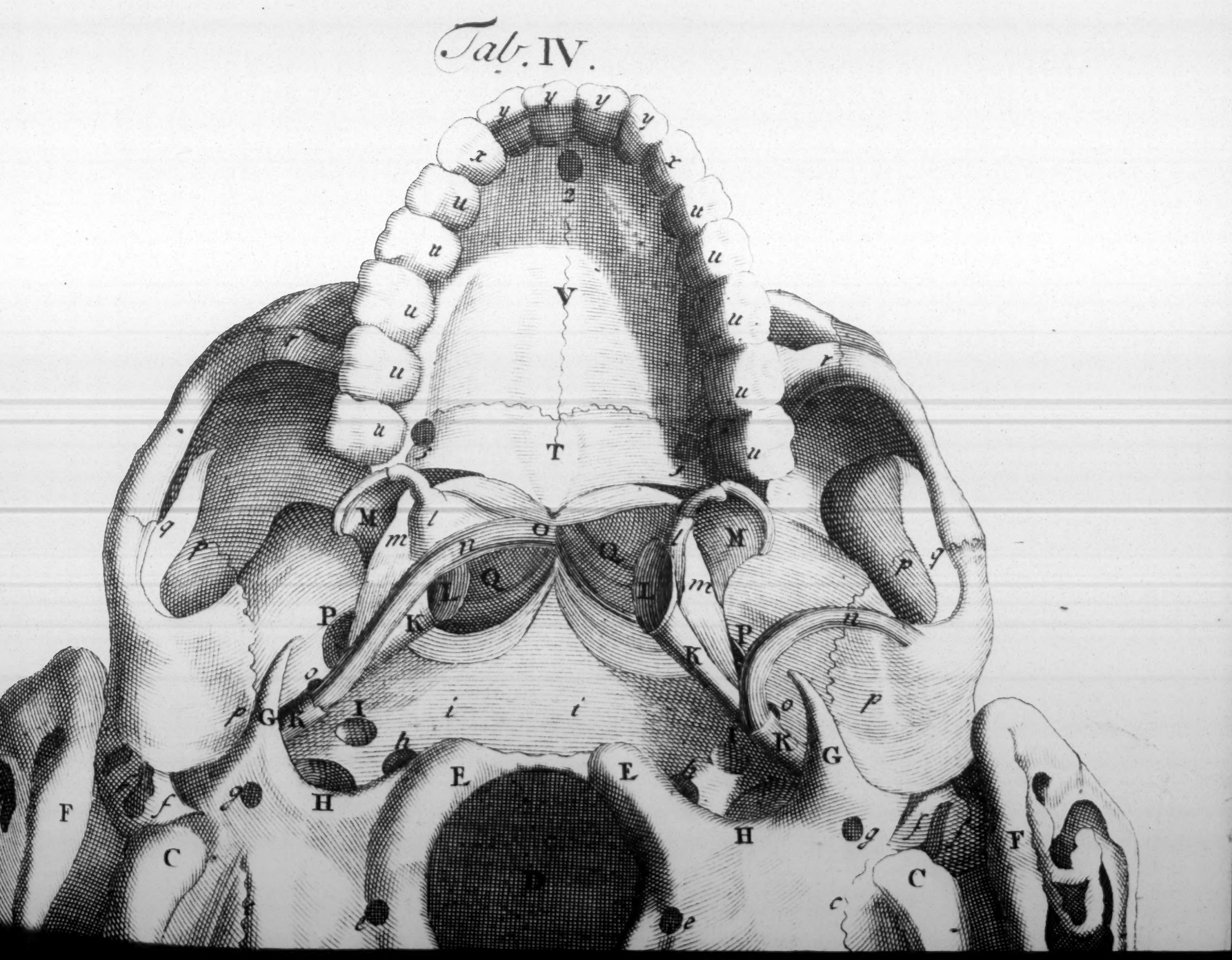
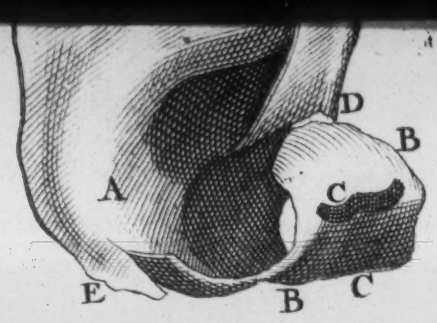
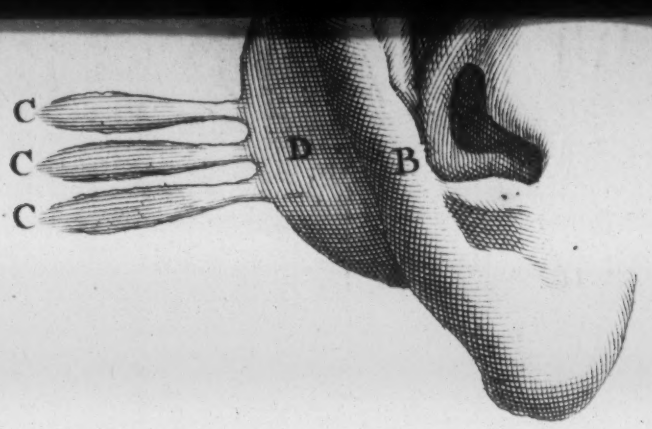
Vol 2. pag. 216.

Tab. III.

Tab. IV.







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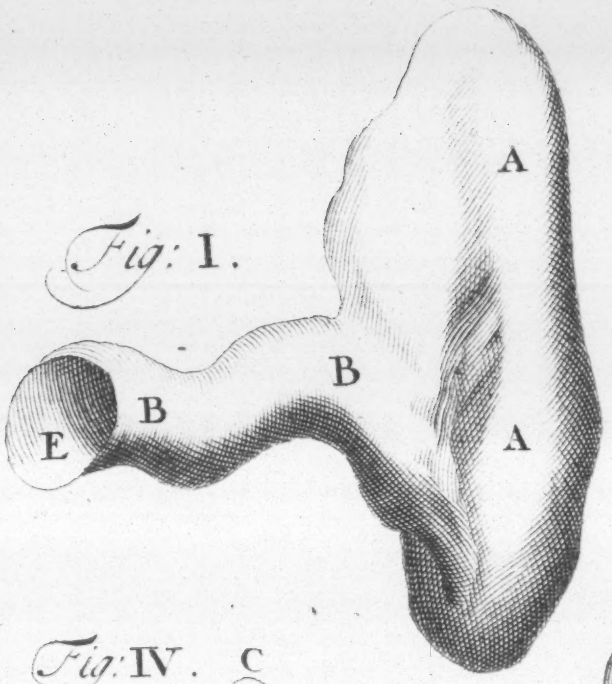

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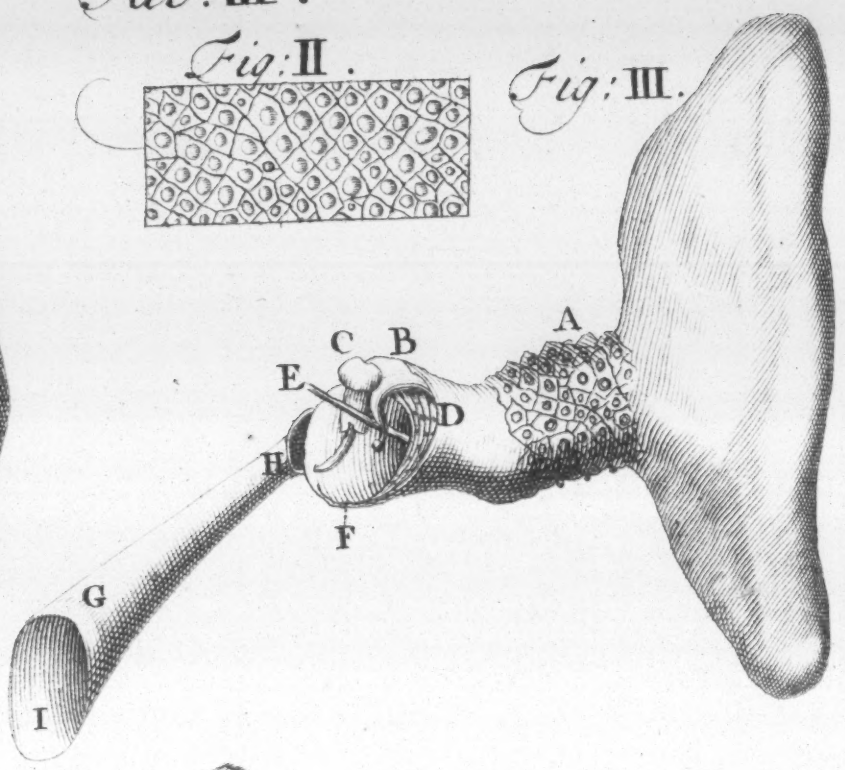

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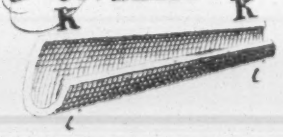

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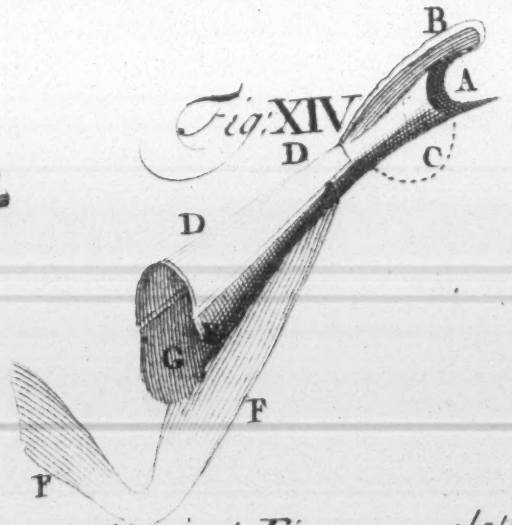

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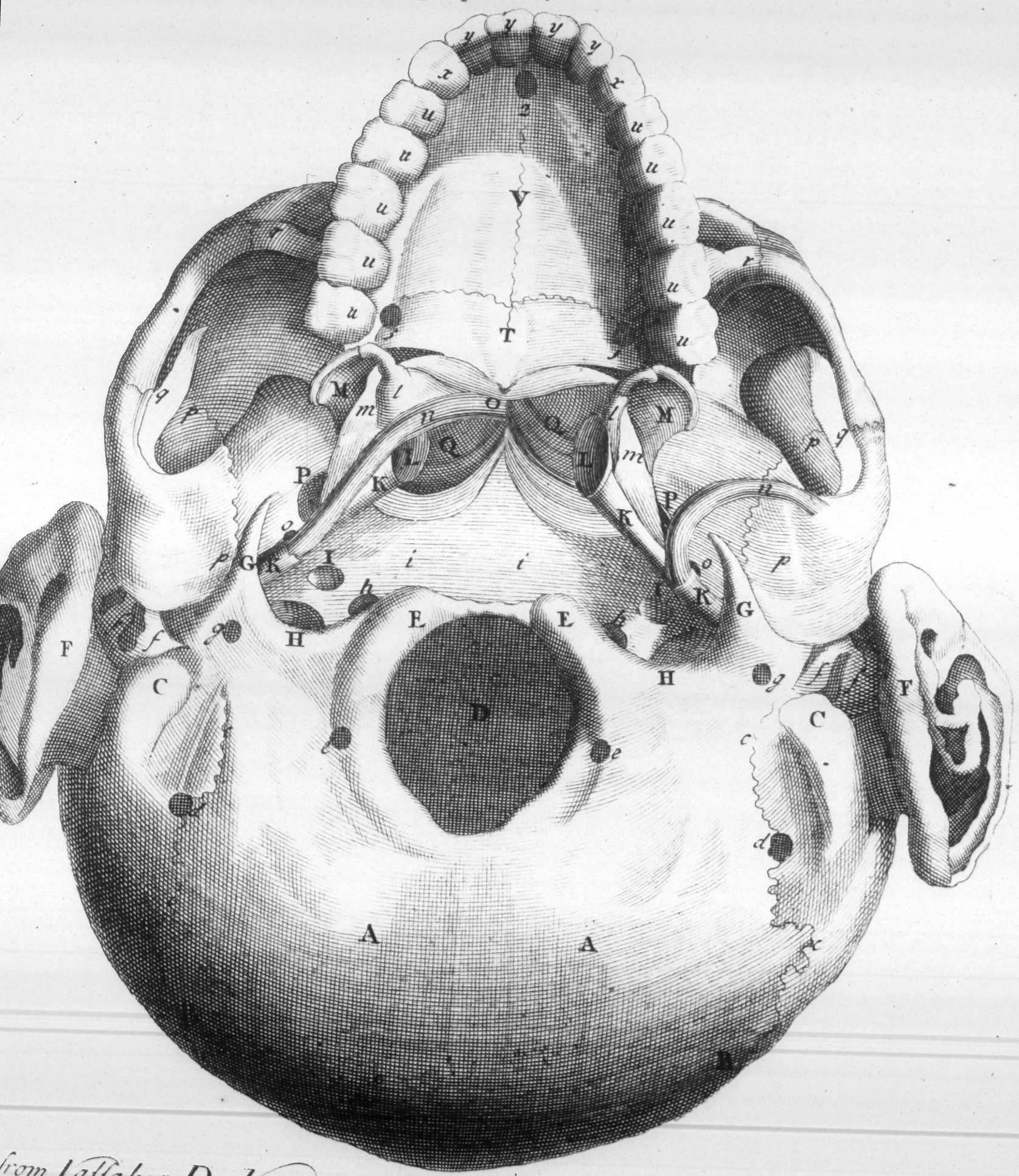


from Valsalva. Du Verney &c.

Fig. IV. *Expreſſes the internal Muſcles, diſcovered by the Author.*

The Skin, cut ſo that the ſubject Muſ- may appear.
e Muſcle *Tragus.*
C, C. The Skin cut that the *Antitragus* Muſcle may appear.
D. The Muſcle *Antitragus.*

II. *This Table pourtraits the Auricle after ſuch a Manner, that the Courſe of the Nerves, Veins, and Arteries, come all in View at once.*

he *Auricle*, with the *Helix* and *Anthe-* ſomething depreſs'd towards the *ha.*
Nerve ſpringing forth betwixt the and ſecond *Vertebræ* of the Neck, and deſcending.
Branch of the ſame Nerve, after its ning backwards, going towards the ricle.
Branch to the lower Mandible.
Branch to the Muſcles in the Neck, off near its Original.
Another Branch of the Nerve *C.* to the *rotide.*
Another Branch from *B.* to the *Parotide.*
That Branch from *B.* that aſcends be- nd the Auricle.
The Place where the Branch *G.* the rning of which is uſed by ſome for ring the Tooth-Ach, may be moſt cer- inly burned.
The Branch *B.* paſſing behind the Auri- towards the upper Part of the Head.
The *Portio Dura* of the Auditory Pair of Nerves, cut where it proceeds from *Fallo- ian's Aquæduct.*
L. A Branch of the ſame Portion ſubdivided into little Branches.
M, M, M. Thoſe which are diſperſed thro' the Face.
N. Another Branch of the ſame Portion, from which many Sprigs are ſent to the inferior Mandible.
O, O, O. A Branch of the ſame, which tending towards the upper Part of the Head, has Reſpect to the *Auditory* Paſſage, and likewiſe the *Auricle.*
P. A Trunk of the external Jugular Vein, into which the Auricle remits Blood by two of the venous Branches, *p, p.*
Q. The external Branch of the *Carotide* Artery, which being here cut off from the Bunch *r*, ſends to the *Parotides* the Branch *s.* to prevent the Confuſion of the lop'd-off Part, which proceeds from behind the Auricle; but the Branches *t, t.* ariſing from thence by the fore Part of the ſame, ſends the large Branch *U*, to the upper Parts of the Head.

Tab. III. Fig. I. *Shows the* Auricle, *together with the* Auditory Paſſage, *from the hinder Part; yet both of them ſomething inclining towards the Face, that the whole Turning or Winding of the* Meatus *deſcribed by the Author may appear in Sight.*

A, A. The *Auricle.*
B, B. The Auditory Paſſage.
E. The Extremity of the Auditory Paſſage.

Fig. II. *Expreſſes the Glands of the Auditory Paſſage, with its reticular Body ſeparated from the ſaid* Meatus, *and ſo extended beyond Nature, that the Parts may appear larger and more diſtinguiſhable.*

Fig. III. *Demonſtrates the Membrane of the* Tympanum, *the* Chorda, *t* Incus, *the* Malleus, *and* Euſtathius's Tube, *all united, together with t* Auricle *and the* Auditory Paſſage, *with the* Glands *of the ſame.*

A. The Glands of the Auditory Paſſage delineated in their natural Poſition, with the reticular Body, which we have ſhown in *Fig.* II. beyond their Size.
B. The *Incus.*
C. The *Malleus.*
D. The bony Portion from the Partition of the *Maſtoide Proceſs.*
E. The *Chorda Tympani.*
F. The Membrane of the *Tympanum* rai inwardly from the *Malleus.*
G. Euſtachius's Tube, or rather his Cavit
H. The Beginning of the Tube.
I. The End of the ſame.

Fig. IV. *Shows the* Malleus *and its Proceſs larger than the natural Size.*

A. The Head of the *Malleus*, agreeable to the Part by which it is articulated with the *Incus.*
B. The *Manubrium.*
C. The Head of the *Malleus* according to the oppoſite Part.
D. The leſſer Proceſs.
E. The leaſt Proceſs.
F. The great Proceſs, from which the M *nubrium* is form'd.

Fig. V. *Repreſents the* Malleus, *and its Muſcles all exceeding Natur*

G. The *Malleus.*
H. The Muſcle of the leſſer Proceſs.
I. The Muſcle of the leaſt Proceſs.
K. The Muſcle of the great Proceſs.

Fig. VI. *Repreſents the* Incus, *and that call'd the* Os Orbiculare, *larger th the Natural Size.*

L. That Part of the Body of the *Incus* which is Articulated with the *Malleus.*
M. The longer Proceſs of the *Incus.*
N. The Orbicular Bone, which is join'd to the Extremity of the ſame longer Pr ceſs.
O. The ſhorter Proceſs of the *Incus*

Fig. VII. *Shows the* Malleus, *the* Incus, *the* Os Orbiculare *altogether as t are naturally connected, but larger than the Life.*

P. The *Incus.*
Q. The *Malleus.*
R. The *Os Orbiculare.*

Fig. VIII. *Demonſtrates the* Stapes *and Orbicular Bone, the* Baſis *of t* Stapes *according to the internal and external Appearance bigger than Natural Size.*

S. The Stapes or Stirrop.
T. The Head or Top of the Stirrop, upon whoſe ſmall Cavity the Orbicular B is placed.

The Baſis of the Stirrop, which is Gibbous or Bunching, according to the internal Appearance of it, or in reſpect of the *Veſtibulum*.

X. The ſame *Baſis* according to the external Appearance, in reſpect to the *Stapes*, which is Concave.

Fig. IX. *Expreſſes the* Stirrop *and Membrane by which its Baſis is bound about the* Feneſtra Ovalis, *equally exceeding the natural Magnitude.*

Fig. X. *Shows the* Stirrop *with the Orbicular Bone placed in its proper Situation, likewiſe the Muſcle of the* Stapes, *all exceeding Nature.*

A. The *Stirrop* with the Orbicular Bone in its proper Poſition.

B. The Muſcle of the *Stapes* or *Stirrop.*

Fig. XI. *Repreſents all the little Bones in Order, as they are naturally fix'd yet beyond the Life, and whoever is deſirous to ſee the natural Magnitude and Situation of the whole Fabrick of the Ear, muſt be referr'd to the* Xth *Table.*

C. The *Incus.*
D. The *Malleus.*

F. The *Stapes*, betwixt which and the *Incus* the Orbicular Bone is to be ſeen.

Fig. XII. *Shows the new Muſcle of* Euſtachius's *Tube.*

H. The fleſhy Part of the Muſcle.

I, I. The tendinous Part of the ſame.

Fig. XIII. *Explains the Cartilage of* Euſtathius's *Tube turn'd Inſide out.*

J, J. Part of the *Cartilage*, which the Foreſide of the *Tube* compoſes for the leſs Part.
K, K. Part of the *Cartilage* which the Backſide of the *Tube* compoſes for the greater Part.

Fig. XIV. *Repreſents* Euſtathius's *Tube ſeen from the back Part, together with all its Parts in Situation; and the Bony Channel by which the Muſcle of the largeſt Proceſs of the* Malleus *proceeds.*

A. The Beginning of the *Tube.*
B. The bony Channel of the Muſcle of the great Proceſs of the *Malleus* laid open.
C. The bony Part of the *Tube.*
D, D. The *Cartilaginous* Part.
E e. The *Membranous* Part.
F F, The new Muſcle of the *Tube.*
G. The End of the *Tube.*

Tab. IV. *Expreſſes the outward Site or Appearance of the Baſis of the hairy Scalp, the fore Part being rais'd ſo that* Euſtathius's *Tube, the new Muſcles and other Parts, may all in their due Poſitions be expos'd to the naked Eye.*

A, A. The Bone of the *Occiput* or hind Part of the Head.

B, B. The *Lambdoide Sutures.*
C, C. The *Mamillary Proceſſes*

c, c, c, c. The *Sutures* of the Temple-Bones with the *Occiput.*

D. The great *Foramen* of the *Occiput*, by which the ſpinal Marrow and vertebral Arteries paſs out.

d, d New *Foramina* for the Ingreſs of the *Occipital* Veins within the *Cranium* or Skull, which are obſerv'd to lie ſometimes greater and ſometimes leſs.

E, E. Two Proceſſes of the *Occiput*, by which its Articulation is made with the firſt *Vertebra* of the Neck.

e, e. Foramina which give way to the vertebral Veins at the turning off of the Jugulars.

F, F. The *Auricles.*

f, f, f, f. The Cartilages of the auditory Paſſages with their Inciſures.

G, G. The *Styliform'd* Proceſſes.

g, g. The *Foramina* making the extream Duct of *Fallopius*, by which the *Portio dura* of the Pair of auditory Nerves go out on both Sides.

H, H. The *Foramina* by which the Jugular Veins iſſue out from their Holes.

h, h. The *Foramina* for the Paſſage of the ninth *Conjugation* of Nerves.

I, I. The *Foramina* for the coming in of the *Carotide Arteries.*

i, i. The internal Membrane inveſting the Noſtrils, from whence being produced towards the *Larynx*, it is left in its Place.

K, K, K, K. Euſtachius's Tubes, whereof two *K, K.* towards the *Styliform'd* Proceſs ſhow the ſame *Oſſeous* or bony Part; the two other *K, K.* ſignify the remaining Part.

L, L. The extream Orifices or Ends of the Tubes.

l, l. The internal *Alæ* of the *Pterygoide Proceſſes*, by the inferior Part of which the new Muſcles of the Tubes tranſmit their Tendons.

M, M. The external *Alæ* of the *Pterygoide Proceſs.*

m, m. The new Muſcles of the Tub whoſe Tendons run out by the inferi Part of the Wings *L, L.* and fro thence terminate about the inferior Ma gine of the internal *Foramina* of the No into their Membrane.

n, n. The Muſcles term'd *Salpingoſtaphyli* the Right of which is left in its natura Poſition, but the Left is cut off from it Companion and out of Sight, that th Progreſs and En d of the Tube, and th Inſertion of the new Muſcles there may plainly appear.

O. The Place where the left Muſcle is cut of

o, o. The *Foramina* for the Ingreſs of the Ar teries of the *Dura Mater.*

P, P. The *Foramina* by which the large Branches of the fifth Pair of Nerves g out.

p, p, p, p. The Sutures of the *Temporal Bone* with the *Os Sphenoidis.*

Q, Q. The internal *Foramina* of the Noſe.

q, q. The Sutures of the Proceſſes of th Temporal Bones with the firſt Pair o Bones of the upper *Mandible*, by whic two the *Os Jugale* becomes united by th Suture.

r, r. The Sutures of the firſt Pair of Bones of the upper *Mandible* with the third Pai of Bones of the ſame Mandible.

s. s. The *Foramina* for the Excurſion of th Blood-Veſſels to the Palate.

T. The Fifth Pair of Bones of the uppe Mandible.

V. The Third Pair of Bones of the upper Mandible, forming the Arch of the Palat with the former.

u, u, u, u, u, u, u, u, u. The *Dentes Molares* or the Grinders.

x, x. The Dog Teeth.

y, y, y, y. The *Inciſores*, or Cutters.

2. The *Foramen* for the Paſſage of the Hu mour which is tranſmitted from the Ca vities of the Noſtrils to the Palate by two ſmall Ducts.

The

The Second Part of Valſalva's *Treatiſe of the Ear, containing the Uſe of the Parts.*

CHAP. IV.

Of the Uſe of the Auricle and Auditory Paſſage, or the external Cavity of the Ear.

TO avoid Circumlocutions and Repetitions, I ſhall come directly to the Matter in Hand, and firſt ſhow the Uſe of the *Auricle*, delineated *Tab.* I. *Fig.* I. The Motions of Sound, whether they are Vibrations, Tremblings, Shakings, or Undulations, or whatever elſe, that have been ſuppoſed by the wiſeſt Philoſophers of all Ages, are convey'd by a certain Inſtrument or Organ ſtretch'd out or dilated like a Funnel, which according as it is unequal in its Cavities and Prominencies, it gains ſo much the larger Superficies. Hence it is that it conveys more Motions of Sound to the Auditory Paſſage, and thoſe Cavities are ſo formed and diſpoſed, that with certain Reflections they may thruſt forward thoſe Motions into the Auditory Paſſage; and who does not ſee the Firmneſs of the Cartilage of the Auricle, which conduces to the ſame End by its impelling Force, which is not a little aſſiſted by the Conſtitution of the Integuments, which in the ſaid Cavities are more particularly deſtitute of Fat. See *Tab.* I. *Fig.* II.

Neither is the ſtrong Impulſe of the Motions of Sound performed by the Conſiſtence of the Cartilage, and the Defect of Fat ſufficient; but before they arrive at the Auditory Paſſage, the Auricle is aſſiſted to repel more forcibly by the Mediation of Muſcles; for that Part of the Ear whereby the Motions paſs to the *Meatus*, the *Concha* is ſurrounded with Muſcles, which perſiſting conſtantly in a tonick Motion, confirms and erects every Part, ſo that the whole *Concha* continues in that State and Tone, whereby the Motions of Sound may yet be more forcibly turned into the Paſſage; for the ſuperior Muſcle always ſupports the upper Part, and the poſterior Muſcles the hind Part, as is delineated *Tab.* I. *Fig.* III. and IV.

Neither does the Auricle only receive Sounds, but it has likewiſe Power to expel them; for which End the Author has aſſign'd the Sebacean Glands, diſcovered by himſelf, which are placed about the *Concha*, leſt the Parts of the Auricle more ſubject to continual Motions, being deſtitute of Fat, ſhould grow too dry, for the ſame Reaſon that the Palms of the Hands and Soles of the Feet, becauſe of their Action, have larger and greater Plenty of Glands inſerted into them to moiſten them. Beſides, there are other Uſes of this Gland, which are principally diſcovered in forming the Tumours found in theſe Parts, collected in a Cyſtis or little Bladder called the *Steatoma*, which has its Original in theſe Glands. The Matter contained in the *Follicula* being altogether the ſame as that found in the *Sebacean Glands*.

The Motions of Sound intruded from the Auricle into the Auditory Paſſage, ſtruggle by this Means to get into the middle Cavity of the Ear; but how much the Force of them is encreaſed we muſt enquire, by conſidering the Straitneſs of the Paſſage, and the Crookedneſs or Windings that increaſe or leſſen their Motion; as we may obſerve by a crooked Tube or Horn made uſe of to aſſiſt ſuch as have a Difficulty of Hearing. Beſides which, the *Inciſures* that are obſervable in the Auditory Paſſage, are a conſiderable Addition to the Strength of the Parts and the Aſſiſtance and Furthering of the ſonorous Motions, according to the Obſervation made by *Rondellus*, Mathematical Profeſſor of *Bononia*, who made himſelf a Hearing-

ing-Tube of ſeveral Foldings of Paper paſted together, by which the common Sounds of the Voice were conveyed to him ſo intelligibly as to render him capable of Converſation.

The Strength of the Motions of Sound are conſiderably encreas'd in the Auditory Paſſage from the Partitions of the *Meatus* being chiefly compoſed of Bone, and the external Part aſſiſted by the Cartilages that help to reflect the Sound into the Paſſage; and the remaining Organ of Hearing is hollowed in the Bone, as far as it is uſeful and neceſſary, that the ſonorous Motions ſhould enter into the inmoſt Receſſes of the Ear; and the Skin of the Auditory Paſſage, for the chief Part, or at leaſt the better half, is ſtretched and extended to the utmoſt Fineneſs; by which Means, from its exquiſite Thinneſs, it becomes ſenſible of the leaſt external Injury that may affect the Membrane of the *Tympanum*; and this may be an uſeful Obſervation to all People how they make too free with Ear-pickers; for that Part of the *Cutis* in the Auditory Paſſage, if it was defended from certain Kind of Injuries, it could not be of that Uſe, occaſioned by its fine Extention, to the Motions of Sound; for there is a Wax with a proper Viſcidity ſeparated, like the Aqueous Humour I ſpoke of before, to moiſten this fine extended Skin, that it might preſerve its curious Texture againſt the continual Beating or Impulſe of the ſonorous Motions, which has been already hinted concerning the Uſe of the *Sebacean Glands.*

But as the Ear-Wax and the Senſibility of the ſaid Membrane ſerve to keep the Membrane of the *Tympanum* from common Injuries; ſo in the *Fœtus*, leſt the Liquor of the *Amnium* ſhould paſs thro' and relax this Part, it is provided that there be a cloſe Conſtriction of the *Meatus* at its firſt Entrance, and that it be performed by a groſſer Subſtance; which two Things, when the Infant is born, are not preſently removed, leaſt the Ears of the new-born Child ſhould be expoſed to the Injuries of the external Air; and therefore it is evident they hear little or nothing for ſome few Days after their Birth.

CHAP. V.

The Uſe of the Tympanum *or middle Cavity of the Ear.*

Like as the Anatomical Conſideration the Auricle and the Auditory Paſſ ſhows that the Motions of Sound ſtrengthened thereby, and convey'd to *Tympanum*; ſo the Contemplation of *Tympanum* ſhows thoſe Motions cannot carried thro' the *Tympanum* into the Lab rinth, except by the mechanical Motion the Four little Bones; which that I may demonſtrate to your Underſtanding, I ſh proceed directly to explain the Uſes of little Bones and the *Feneſtra Ovalis*, de neated *Tab.* III. *Fig.* V. VII. VIII. XI. a *Tab.* IX. *Fig.* I.

For firſt of all, the *Malleus* is ſo form and made moveable upon ſuch a Place, th itrepreſents, as the Mechanicks ſay, a Cro or *Levere* of the firſt Kind; for the *Ma brium* or Handle, as one Extream, is plac to the Centre of the Membrane of the *Ty panum*; but the Head, to wit, the other E tream, extends to the *Maſtoide Sinus*, makin betwixt both a Roller; that is to ſay, the oppoſite Inſertions of the Muſcles of t leſſer Proceſs, and the leaſt Proceſs, fro the tonick Motion of which, the Firmne of the Roller depends. Again, from the Deſcriptions, and having Reference to t Figures pointed to, you may find the *Inc* alſo makes a Levere of the ſame Kind, an the *Stapes* is joined to the longer Proceſs and ſo by that Motion it follows that this alſo moved. From whence it may be co lected, that at the ſame Time that the Ha dle of the *Malleus* is more or leſs beat bac towards the Cavity of the *Tympanum*, that Time the Baſis of the *Stapes* will b moved more or leſs upwards by the *Feneſtra Ovalis*, and that it returning towards t Auditory Paſſage, at one and the ſame Tim will ſlide back again towards the *Tympanum*. All this that we have collected from th mechanical Conformation of the Parts, an which in Reading may appear too difficul or obſcure to be underſtood, or perhaps ſo

e only imaginary: All this the Author
ms is visible to the naked Eye, and may
asily discovered in a recent Subject.
aving therefore examined the Structure
he Bones, we shall come to the Con-
ation of the Muscles; but having al-
y spoke of that of the Processes of the
lleus, we shall only examine the Muscle
he *Stapes*, which seems to be assign'd to
Use, lest by any Force of some greater
tion the Basis of the *Stapes* should rise to
h by the *Fenestra* that the Membrane
ich binds it round should be broke.
rwise, to promote the Restitution of the
uls'd Bones, together with the Elastick
e joined to the little Bones of the Mem-
ne of the *Tympanum*, or at least to wary,
in the stronger Return the slender Ar-
lation of the *Stapes* with the other Bones
uld be disunited.

The Membrane of the *Tympanum* seems
adhere to the Handle of the *Malleus*; so
the direct Lines of the Motions of
nd may not fall upon the *Manubrium* or
ndle it self; and also, that the Stroaks
ich it communicates by those Concus-
ns may not beat forcibly upon the said
nubrium. Another Use of the Membrane
the *Tympanum* is to contribute towards
carrying forward of the sonorous Mo-
ns; for its conick Cavity being therefore
tracted into a narrow Compass, seems
compel some of the Rays of the same
tions towards the Top thereof; but the
remity of the *Manubrium*, to wit, that
rt which is the remotest from the Roller,
asily compell'd to move before the others,
ing at the Top or End of that conick
vity; but where the Levere is destroy'd,
re the Hearing is dull and difficult to re-
ve.

The Membrane of the *Tympanum* cannot
succesfully resist those useful Concussions
the Motions of Sound where it is relax'd
distended, therefore it stands in Need of
Assistance of the Muscle of the greater
ocess of the *Malleus*, so to draw it back,
it may not only be aptly fashioned into
t conick Cavity, but so duly stretch'd, as
may be easily moved by the invading Mo-
ns of Sound; to which Purpose there is
certain Humour which moistens the Ca-
ty of the *Tympanum*, both internally and externally; for if that *Foramen* we have formerly mentioned be allowed, it will be eaty to account for the Access of such an Humour that may flow by the *Mastoide Sinus*, into which it distils from the Cavity of the *Cranium* by Means of those discovered *Foramina*. See *Tab.* III. *Fig.* V. and *Tab.* IX. *Fig.* I. II. The Uses of these *Foramina* are very numerous to all the Disaffections of the internal Parts of the Ear; for by these *Foramina* the morbid Fluids are driven out from the Cavity of the *Cranium* thro' the Auditory Passage, sometimes by the Cavity of the Mouth, and sometimes by the Ears: Nay the Pains of the Head that are oftentimes very acute and dolorous, from Superfluities of *Serum*, are by these *Foramina* forced into the Channels of the Nose, and voided by the Nostrils. Likewise the external Air by this Means, whereof we receive Plenty by the Mouth and Nose, may immediately act upon the *Dura Mater*.

From hence we may account for that Explosion that is made so frequently in Sneezing, and the Uses that may be made of this in Wounds that penetrate the Head, where, by holding the Nose and Mouth close shut, the Air presses with such Force from within, as to throw out by the Wound a *Sanies* or corrupted Matter from the Cavity of the *Cranium*: So that if any Person have an Ulcer in the *Tympanum* or neighbouring Parts, or any Thing of that Kind, from whence an *Ichor* or filthy *Serum* constantly distils into the Auditory Passage, if the said Person shut his Mouth and Nostrils, so as to confine and coacervate the Air, that it be pent up in the Cavities of those Parts, it will force its Way out, and make a plentiful Discharge by the Auditory Passage, and by that Means readily deterge and heal the Ulcer.

And lest the Humour that is design'd for moistening and lubricating the Membrane of the *Tympanum* should prove too superfluous, and too much relax the said Membrane, and from hence render the sonorous Motions useless, they may be carried off by *Eustathius*'s Tube to the *Larynx* and the Nose. See *Tab.* III. *Fig.* III. *&c. Tab.* IV. and *Tab.* IX. There are likewise provided glandulous Substances to these *Tubes*, lest by any Accident they should be closed, and that these might in some Measure do their Office; for if *Eustathius*'s Tube be obstructed or

lock'd

lock'd up, the Hearing is preſently loſt. And ſince it is requiſite to Hearing that the Compreſſion from the Membrane of the *Tympanum* allow a ready Way for the Air thro' the Tube, therefore, leſt this Paſſage ſhould not be entirely free, the wiſe Author of Nature has provided, beſides the Muſcle of the greater Proceſs of the *Malleus*, another Aſſiſtant, which is the new Muſcle of *Euſtachius*'s Tube, delineated *Tab.* III. *Fig.* XII. and *Tab.* IV. *Let. m, m. Tab.* IX. *Fig.* I. *&c.*

CHAP. VI.

Of the Uſe of the Labyrinth or internal Cavity of the Ear.

AS the Labyrinth or internal Cavity of the Ear is the moſt difficult to be underſtood of all the Parts belonging to the ſame, ſo it requires the greateſt Induſtry and Perſpicuity to explain it. After the Motions of Sound have enter'd the *Veſtibulum* by the *Feneſtra Ovalis*, there are Six ſeveral Ways by which they may proceed further, to wit, Five Orifices of the ſemicircular Channels, and that of the Channel of the *Cochlea*, which we call the *Scala* or Ladder of the *Veſtibulum*. Which ought firſt to be inquired into, Whether all theſe Motions enter theſe Ways together, or only ſome, if not all? Whether it be the Orifice of the Ladder of the *Veſtibulum* that they enter, or the Orifice of the ſemicircular Channels? Or laſtly, Whether they enter the Orifices of all the Channels? It appears moſt propable, that they do not enter equally into all the Paſſages, but enter chiefly ſome of the Orifices of the Channels, eſpecially the common Orifice, and the ſtrait Orifice of the leaſt Channel; and this is the Reaſon I aſſign, Firſt, becauſe the Motions of Sound, though they run in a Round, yet they ſtrike more lively and ſenſibly upon thoſe Parts that are oppoſite to the Place from whence they came, than on thoſe which are diſpoſed on one Side, or behind; from whence I conſider, that Nature has not conſtituted or framed all theſe Ways oppoſite to the *Feneſtra Ovalis*; but here the Orifice of the Scale of the *Veſtibulum*, and there the broader Orifice of the leaſt Channel, are placed on the Sides of the *Feneſtra*, and only diſpoſed oppoſite to t common Orifice and the ſtrait Orifice the leaſt Channel. See *Tab.* VIII. *Fig.* Therefore the Motions of Sound enter thoſe two Orifices by the ſtrait Orifice the leaſt Channel, they pervade this ſemic cular Channel; but by the common Orif they run through the greater and le Channels; which while they are doi they ſtrike the Zones contained in the Cha nels; from whence it comes, ſince theſe a nothing elſe than the Expanſions of the ſo Auditory Nerve, that the Senſation Hearing ariſes. See *Tab.* VIII. *Fig.* V. V VIII. and *Tab.* IX.

The Uſe of the Orifice of the leſſer Cha nel, and that of the leaſt, is, that what ſent out of theſe may more eaſily enter t Orifice of the Scale of the *Veſtibulum*, whic is divided by a thin Membrane or Zo from the Scale of the *Tympanum*; but t Scale of the *Tympanum* may be diſtinguiſh from its Cavity by a very thin Membrane the *Feneſtra Ovalis*, delineated *Tab.* VI *Fig.* V.

Hence we may collect, that the Air thru forward in the Channels, may eaſily, ſliding through the ſaid Orifices, give Wa becauſe the Scale of the *Veſtibulum* being th form'd, having its Orifices placed oppoſit has a Place in Readineſs wherein the co tiguous Air may be immediately ſent fo ward continually, and without Difficult See *Tab.* VIII. *Fig.* VI. For the Air of t Scale of the *Veſtibulum* reſiſting the Propu ſion when it can drive on that which is co tinued in the Scale of the *Tympanum*, not b the Pores, or any certain Communicatio but by the Compreſſion of the delicate Fin neſs of the Zone of the *Cochlea* which ſep rates both Scales; for that Air which is co tained in the Scale of the *Tympanum*, readi gives Way to the Preſſure of the Zone; I d not ſay by breaking into the *Tympanum* the *Feneſtra rotunda*, but by agitating a crooking the ſame Membrane, as there is N ceſſity, towards the *Tympanum*; which m be eaſily done; for whatever happens wit in the Ear, occaſioned by the Motion Sounds, it is done in a Moment, at the ſam Time the Propulſion of Air is made fro the Channels to the *Tympanum*.

Having ſpoken of the Uſe of the new Muſcle of *Euſtathius*'s Tube, I ſhall ſhow that the Poſition of the *Feneſtra rotunda* is not oppoſite but on the Side of the Membrane of the *Tympanum*, as deſign'd by Nature, leſt the Air of the *Tympanum* which drives back from this Membrane, by running into the Membrane of the *Feneſtra*, ſhould inconveniently reſiſt its Incurvation; and therefore it is not ſituated at the utmoſt Limits of the *Tympanum*, but a little more within it, ſo that from hence it is that it can in no Ways reſiſt the Motions of Sound, which are tranſmitted to the *Labyrinth* without any Diſturbance to the *Feneſtra*. The univerſal Motions of Sound, after they have run through the ſemicircular Channels, paſs out of them, and ſeem to proceed further into the Scale of the *Veſtibulum* by the proper Orifices of the leſſer Channel, and that of the leaſt broader Channel; for it is not very likely that the Motions of Sound ſhould be loſt among the Channels, when it is obſervable that Sounds, while they paſs thro' the Tubes, ſuch as theſe Channels are, are wonderfully continued. See *Tab.* VIII. *Fig.* V. But the Motions of Sound entering the Scale of the *Veſtibulum*, although they were weak before, by Means of the Windings and Turnings of this Scale, and growing from being wide ſtraiter, they gain Strength and Vigour. Beſides, while the Motions of Sound, by running thro' the Scale of the *Veſtibulum*, pierce the Zone of the *Cochlea*; there they may eaſily excite it to a Senſation, not that I think an Impreſſion received from any Zone of the ſemicircular Channels ſufficient, but only this of the *Cochlea*; not from the different Reſiſtence of the contiguous Air, but from the great Length and Narrowneſs of it, delineated *Tab.* VIII. *Fig.* VII. and IX.

As I have mentioned the Scale of the *Veſtibulum* and its Uſe, ſo I ſhall obſerve to you, that the Scale of the *Tympanum* far exceeds it as to its Uſe in the Motions of Sound, that it may tranſmit thoſe when they have loſt their Force to the Cavity of the *Tympanum* and *Euſtathius*'s Tube; from which Thing no Diſturbance is to be dreaded from the Laxity of the Membrane of the *Tympanum*; as well from the Poſition of the Parts as their Motions, the long Progreſs, irregular Figure and Superficies of the Scale of the *Tympanum*, and the Debility from the Membrane of the *Feneſtra rotunda*. From theſe Things hitherto laid down concerning the Uſes of the Labyrinth, it may be concluded, that the Three Zones of the ſemicircular Channels, together with the Zone of the *Cochlea*, appear to be the proper *Senſorium* of Hearing, and we may reaſonably conclude all Parts do not equally avail to receive the Impreſſion from all Sounds; but different Parts are proper for different Things, according to the Diverſity of Length, Breadth, and the like. According to this, we may reflect on the wiſe Proceedings of Nature, that form'd the Labyrinth of the Ear, and the Parts thereof, of the ſame Size in Infants as Adults; for if the Dimenſions of the Zones had not been the ſame in all Ages of Life, certainly Mankind had heard different Sounds in Infancy than thoſe of riper Years, and conſequently had had different Ideas of Hearing, which from different Times and Habits could not but have produced Confuſion.

A new Deſcription of the Muſcles of the Uvula *and the* Larynx.

THE Uſe of *Euſtathius*'s Tube could never have been exquiſitely deſcribed, and its Uſes ſhown, without ſhowing at the ſame Time the certain Motions and Diſpoſition of the *Uvula*; therefore it is neceſſary that I ſhould ſubjoin a ſhort Account of the *Uvula* and the *Larynx*. There are Three Pair of Muſcles which ſerve the *Uvula*: The firſt Pair is taken for the internal *Pterygoſtaphylini*, but more aptly called *Salpingoſtaphylinum*, which does not ariſe from the internal Wing of the *Pterygoide* Proceſs, but from the inferior bony Part of *Euſtathius*'s Tube; hence it deſcends under the inferior membranous Part of the ſame Tube obliquely, to the Baſis of the *Uvula*, where the Fibres of one Muſcle are continued with the Fibres of the other. See *Tab.* IV. *Let. n, n. Tab.* V. *Fig.* I. and II. *Tab.* VI. *Let. A, A.*

The Second Pair is the *Gloſſoſtaphylinum*: It breaks forth from the Sides of the Tongue in the lower Part of the ſame, with few Fibres; with which being ſomething bound, it is inſerted into the Sides towards the mid-

dle of the *Uvula*. This Muſcle, tho' it is a ſmall one, yet it performs ſeveral diſtinct Motions, as are very plain upon the Mouth being opened, whereby you may ſee the Motions of the *Uvula*. The Third Pair is the *Pharyngoſtaphylinum* : This has a large broad Inſertion from the lower Part of the *Larynx*, where it begins to fix it ſelf to the Gullet, and riſing by the anterior lateral Part of the ſaid *Larynx*, when it comes to the upper Part of it, it bends its Fibres like a Bow, which running under the *Tonſillæ*, knit themſelves to the *Uvula* at the inferior and lateral Part. This Pair of Muſcles, if the Membrane is pull'd off that inveſts or cloaths the *Larynx* and *Uvula*, affords a plain Mark and Diſcovery of their Fibres.

Having accounted for theſe, I ſhall now proceed to the Hiſtory of the *Larynx* ; for indeed the *Uvula* is nothing elſe but a Part of the *Larynx*, and diſtinguiſh'd from it without any Pretence of Reaſon. The *Larynx* or *Pharynx* then is the upper Part of the *Oeſophagus* or Gullet, which ariſes from the *Cricoide* Cartilage, even to the lowermoſt Part of the Head, almoſt in Form of a Tunnel. It has an internal Membrane and Glands which appear the moſt conſpicuous, and alſo fleſhy Fibres, which are diſpoſed into diſtinct Muſcles in the *Larynx* it ſelf. This has Three Orifices, particularly if we will admit the *Uvula* to come into that Number. The greateſt Orifice is that which anſwers to the Mouth, the next opens into the internal *Foramina* of the Noſtrils, and the laſt into the Gullet. See *Tab.* V. *Fig.* II. Which Orifices ought ſometimes to be conſtring'd and ſometimes dilated, that is, ſometimes open and ſometimes ſhut; therefore the *Larynx* is furniſhed with particular Muſcles, which, according to their different Inſertions, receive different Names.

The Firſt Pair, which us'd to be called *Cephalopharyngæum*, as ariſing from the lower Part of the Head, which is what this Author deſcribes among the Muſcles of the *Uvula*, under the Name of *Pharyngoſtaphylinum*, which perhaps ſome may call *Staphylopharyngæum* with as good Reaſon ; for this Pair he places among the Movers of the *Larynx*, as he did among thoſe of the *Uvula*, for indeed it moves both the one and the other, the Muſcles thereof having a Motion at both their Extremities, as we have many Inſtances of other Muſcles in ſeveral Parts of the Body ; ſuch as thoſe betwixt the internal *Foramina* of the Noſe, and the Tubes already deſcribed.

The Second Pair, falſely called *Sphænopharyngæum*, as being erroneouſly ſuppoſed to ariſe from the Proceſſes of the *Sphenoide* Bone, this Author Names *Gloſſopharyngæum*, that breaks out of the Sides of the Tongue in the inferior Part of it near the Muſcle *Gloſſoſtaphylinum*, with the Fibres of which it has a confus'd Origine. Hence it is brought by the upper Part of the *Larynx* in ſuch a circular March, that the Fibres of one Muſcle run with the Fibres of the other, being only divided by a little tendinous Part, delineated *Tab.* V. *Fig.* II. and *Tab.* VI. *Let. c, c.*

The Third Pair, call'd *Stylopharyngæum*, proceeds from the ſtyliform Proceſs. Hence it obliquely deſcends, and by cutting croſs the Fibres of the Muſcle *Hyopharyngæum*, it ends at the Sides of the *Larynx*, delineated *Tab.* V. *Fig.* II. and *Tab.* VI. *Let. E, E.*

The Fourth Pair, which is entirely new, the Author calls *Hyopharyngæum*. It has a double Inſertion in the *Os Hyoides*, one longer, and the other ſhorter : The longer is knit to the cartilaginous Proceſſes, being laterally at the Baſis of the ſame Bone; but the ſhorter to the horny Proceſſes of the ſame, delineated *Tab.* V. *Fig.* II. and *Tab.* VI. *Let. F, F, F, F.* The Fibres receeding from theſe Bounds, inclining towards the oppoſite Parts of the *Larynx*, and ending in the middle of this with a broad Expanſion, where by the Places concurring with the Oppoſites, compoſe a right Line that is tendinous.

The Fifth Pair of Muſcles of the *Larynx* is the *Thyropharyngæum*, for this retires from each fore Side of the *Thyroides* by all its Height, forming two acute Productions, and ſends from its Fibres, obliquely aſcending into the back Part of the *Larynx*, at the Middle, a Right Line that is tendinous, like that of the former : From which Deſcription it appears, that thoſe Fibres do not only compoſe one, but they make two Muſcles, which *Caſſerius* formerly obſerved, the few ſince him have perſued his Obſervation. See theſe Muſcles delineated, *Tab.* V. *Fig.* II. and *Tab.* VI. *Let. G, G, G, G. g, g.*

The laſt Muſcle which remains is the *Cricopharyngæus*, that is placed in the firſt Entrance into the Gullet, and is that which

Tab. V. *The forepart of y^e Uvula. from Valsalva*

Fig: I.

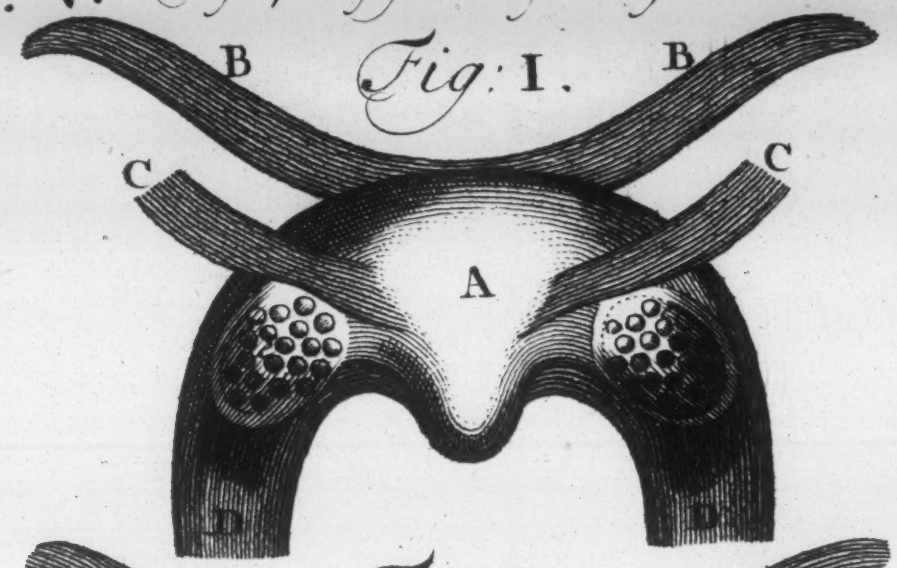
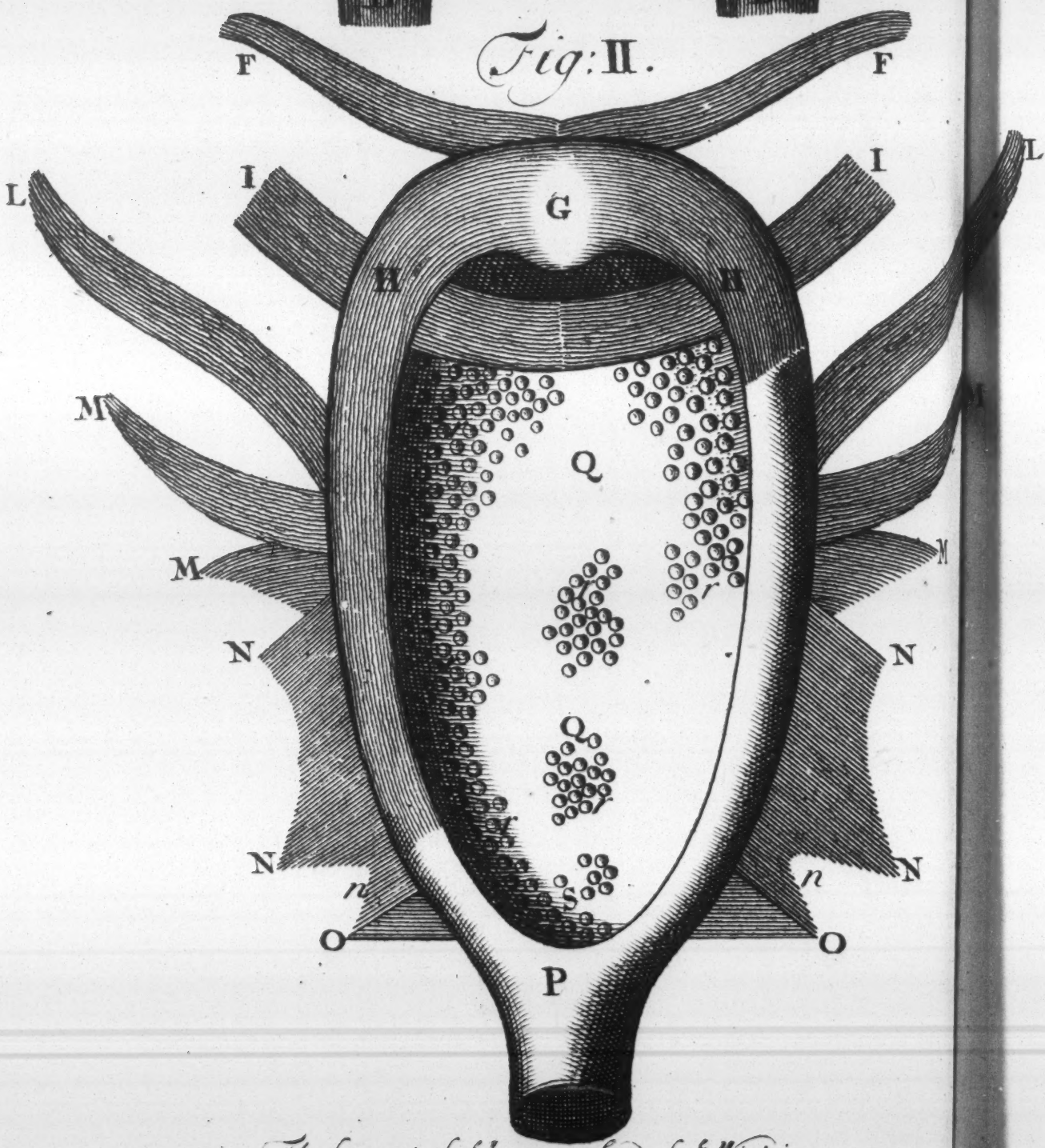


Fig: II.

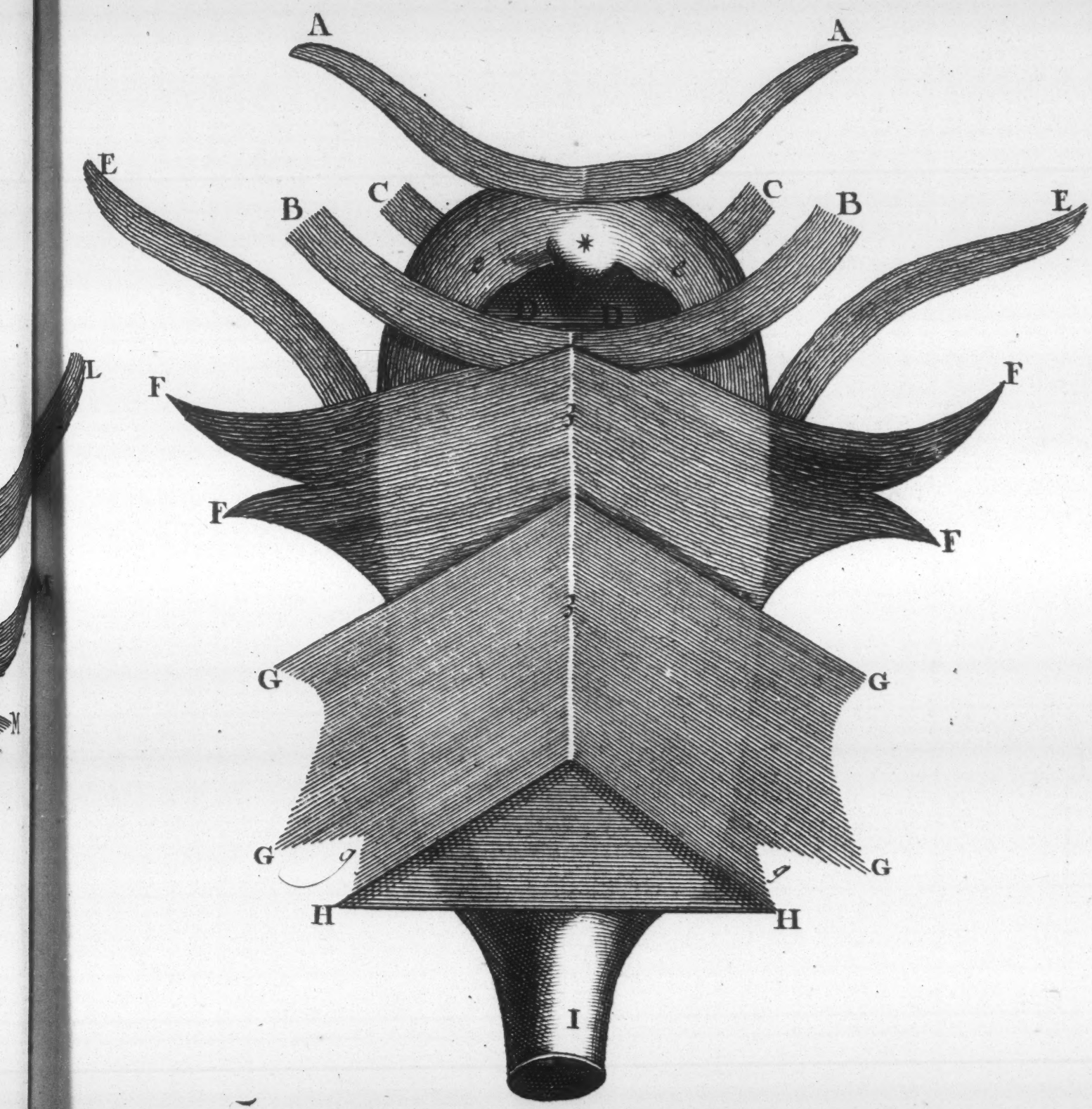


The forepart of y^e Larynx or head of y^e Windpipe

Several Pa^s from Valsa

Vol 2. p: 227.

Tab. VI.



The Hindpart of y^e Larynx & all its Muscles in y^e View from y^e same Author.

from Valsalva &c.

the Nature, and performs the Office of the *Sphincter*; for its Fibres which are under the inferior Production of the Pair of Muscles called *Thyropharyngæum*, retire from the Line with that Part of the *Crocoidis* whose Fibres gird and contract the Gullet. The principal Uses both of one and the other of all the Muscles named, of the *Uvula* and the *Larynx*, are first to assist in *Deglutition* and *Respiration*, or Swallowing and Breathing.

Explanation of the FIGURES.

Tab. V. Fig. I. *Expresses the* Uvula *according to the fore Part, with its Muscles, agreeable to the new Description made of it, and the Figure delineated.*

A. The *Uvula*.
A, B. The Muscles *Salpingostaphylini*.
C, C. The Muscles *Glossostaphylini*.
D, D. The Muscles *Pharyngostaphylini*.
e, e. The *Tonsillæ*.

Fig. II. *Explains the* Larynx *according to the fore Part, with all its Orifices and Muscle, agreeable to the Description of it.*

F, F. The Muscles *Salpingostaphylini*.
G. The *Uvula*, with its Membrane uncovered in the glandulous Part, that the muscular Fibres inserted into them may appear.
H, H. The Muscles *Pharyngostaphylini*, or rather *Staphylopharyngæi*, from the Right Side of which the Membrane that cloaths it is removed, that the whole Progress of the Fibres may be shown.
I, I. The Muscles *Glossopharyngæi*, whose Course that it may appear entire, the upper Part of the Membrane of the *Larynx* is removed.
K, K. The Orifice of the *Larynx* entring the Nostrils.
L, L. The Muscles *Stylopharyngæi*.
M, M, M, M. The Muscles *Hyopharyngæi*.
N, N, N, N. *n, n.* The Muscles *Thyropharyngæi*.
O, O. The Muscle *Cricopharingæus*.
P. The Entrance or Beginning of the Gullet.
Q, Q. The Orifice of the *Larynx* into the Mouth, which here appears greater than it is, because the *Larynx* is removed.
r, r, r, r, r, r. The Glandules more conspicuous in the Cavity of the *Larynx*.
S. The Orifice of the *Larynx* at the Gullet.

Tab. VI. *Explains the* Larynx *and all its Muscles, according to the back Part, and the Description of the Figure.*

A, A. The Muscles *Salpingostaphylini*.
B, B. The Muscles *Glossopharyngæi*.
C, C. The Muscles *Glossostaphylini*.
The *Uvula*, with its Membrane laid bare with the glandulous Part, being drawn a little back, so that the Orifice to the Nostrils may be seen.
D, D. The Orifice of the *Larynx* and the Nostrils.
e, e. The Muscles *Pharyngostaphilini*.
E, E. The Muscles *Stylopharyngæi*.
F, F, F, F. The Muscles *Hyopharyngæi*.
G, G, G, G. *g, g.* The Muscles *Thyropharyngæi*.

H, H. The Muſcle *Cricopharyngæus*,
3, 3. The tendinous Line by which the Muſcles *Gloſſopharyngæi*, *Hyopharyngæi*, and *Chyropharyngæi* meet together.
I. The *Oeſophagus* or Gullet.

Tab. VII. Fig. I.

A, A, That Portion of the Carotide Artery which paſſes thro' the bony Channel to the Brain.
B. The Branch which departs from the ſame Artery near the Entrance into the bony Channel, and provides for the *Tympanum*.

Fig. II. *Demonſtrates the inferior Portion of the Right lateral* Sinus *of the* Dura Mater, *ſeen from the hind Part; and alſo that which* Willis *calls the* Diverticulum, *or turning aſide, which is poſited betwixt the End of the* Sinus *and the Beginning of the Jugular Vein, together with the Occipital Vein and that of the* Tympanum.

A, A. The lower Portion of the ſaid *Sinus*.
B. The Place where this inferior Portion is divided or cut aſunder from the ſuperior.
C. The upper *Sinus* of the *Sellæ Equinæ*.
D. The lower *Sinus*.
E. The Vertebral Vein,
F. The Occipital Vein, or Vein on the hinder Part of the Head, deſcribed by the Author, whoſe Branches, *f, f.* come from the back Parts of the Auricle; but the reſt, to wit,
G, G. Are Branches which are ſent to the ſame from the back Parts of the Head.
H. The *Diverticulum*, which is placed betwixt the End of the lateral *Sinus* and the Beginning of the Jugular.
I. The Beginning of the Jugular Vein.
K. The Vein of the *Tympanum*.

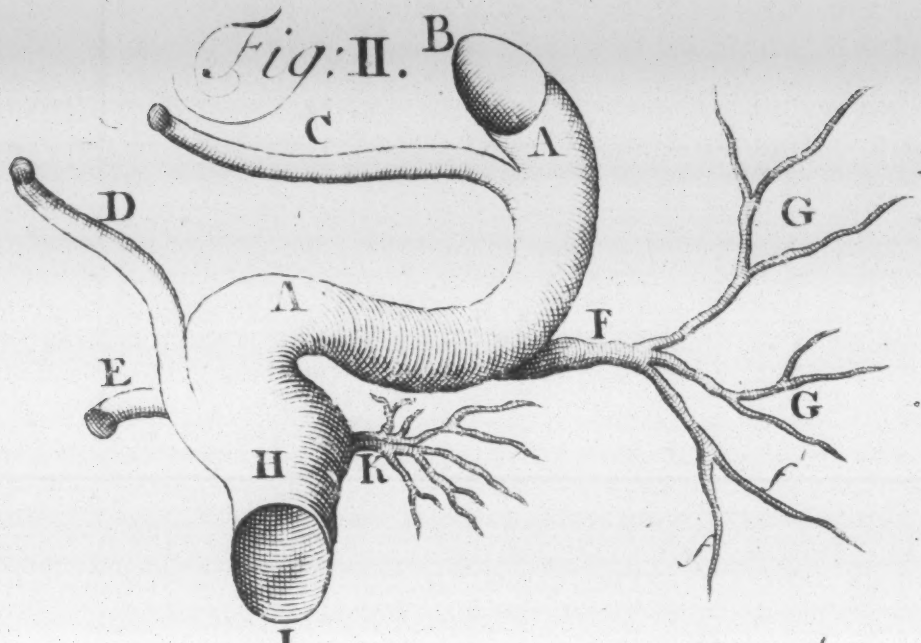
Fig. III. *Shows the whole Progreſs of the* Portio Dura *of the Pair of Auditory Nerves, whilſt it runs betwixt the Common Channel and the Particular, with its Springs or little Branches, which it diſtributes betwixt the Cavity of the* Cranium *and the* Tympanum.

a. The *Portio Dura* contained within the common Channel.
b, b, b. The ſame Portion coming through from the common Channel into another Part of the particular Channel; and from hence into the Cavity of the *Cranium*, within which, by the *Meninges*, and alſo the Trunk of the Fifth Pair, it diſtributes its Branches.
c. A Branch that forms the Chord of the *Tympanum*.
2. The Original of that Branch in th Muſcle of the leaſt Proceſs of the *Malleus*.
d. That Part of the ſame Branch which is called the Chord of the *Tympanum*.
e. That Part of the ſame Branch which paſſes by a particular Channel to the *Dura*, with which it is united.
f. Another nervous Branch which is transmitted from the Fifth Pair, as they call to the *Portio Dura*, with which it is in the ſame Place as the former Branch.
g. The *Portio Dura*, included betwixt other Part of the particular Channel.
h, h. Two Branches of the ſame to the *ſtoide Sinus*.
i. Another Branch to the Stirrop Muſcle.
k. The *Portio Dura* cut in two at the the particular Channel.

Fig.

Tab. VII.

Fig: II.

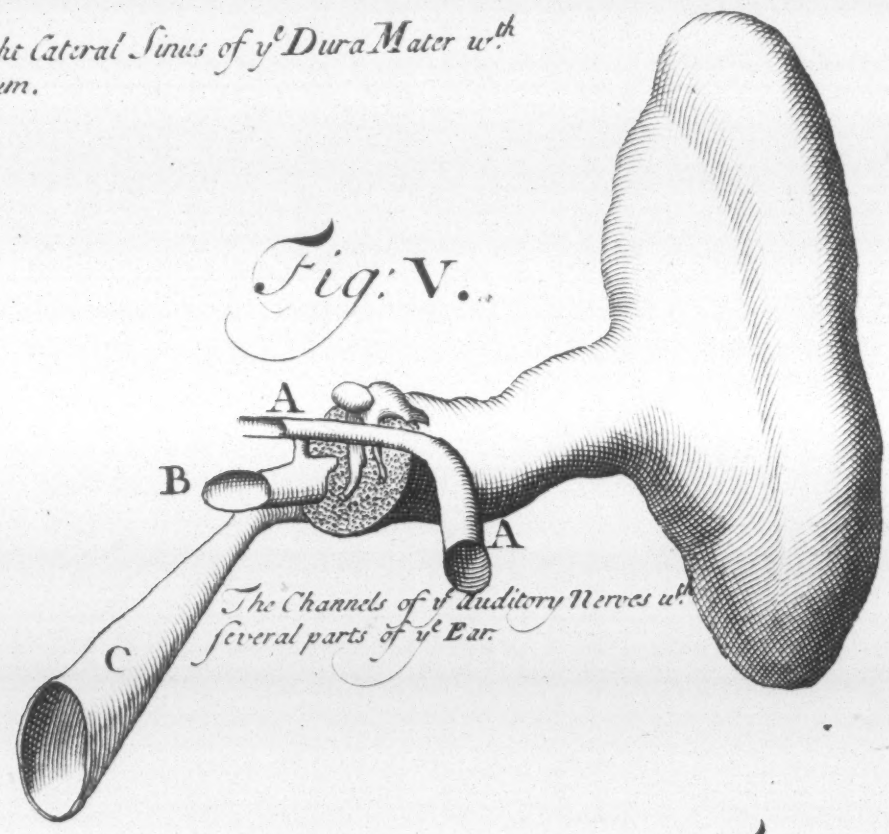


the lower part of y^e Right Cateral Sinus of y^e Dura Mater w^th Willis^s Diverticulum.

Part of y^e Caroud Artery. from Valsalva.

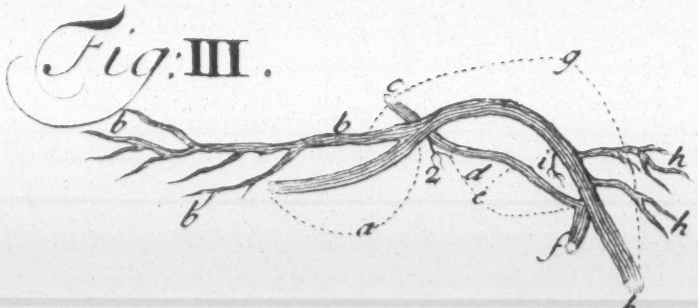
Fig: I.

Fig: V.



The Channels of y^e Auditory Nerves u^th several parts of y^e Ear.

Fig: III.



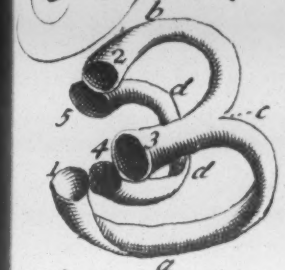
The whole Progress of y^e Portio Dura of y^e pair of Auditory Nerves.

Fig: IV.

The bony Channels thro' w^ch y^e Auditory Nerves run.

Tab. VIII.

Fig: I.



The Semicircular Channels.

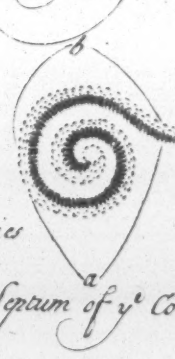
Fig: IV.

The whole Labyrinth turn'd 2 Inside towards y^e Tympanum.

Fig: VI.

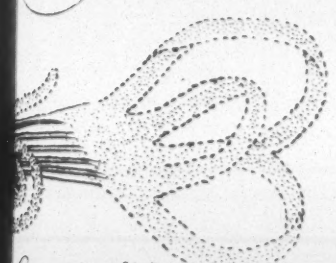
The of y^e Cochleæ their Course & Orificies

Fig:

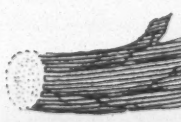


The Septum of y^e Co

Fig: IX.



Same as y^e former Figure but in an te View.



The Port

al Figures relating to the Ear from D

Vol 2 P. 228.

Tab. IX.

Fig: II.

The whole Cavity of ye Labyrinth.

Fig: III.

The Semicircular Channels stretch'd out lengthways.

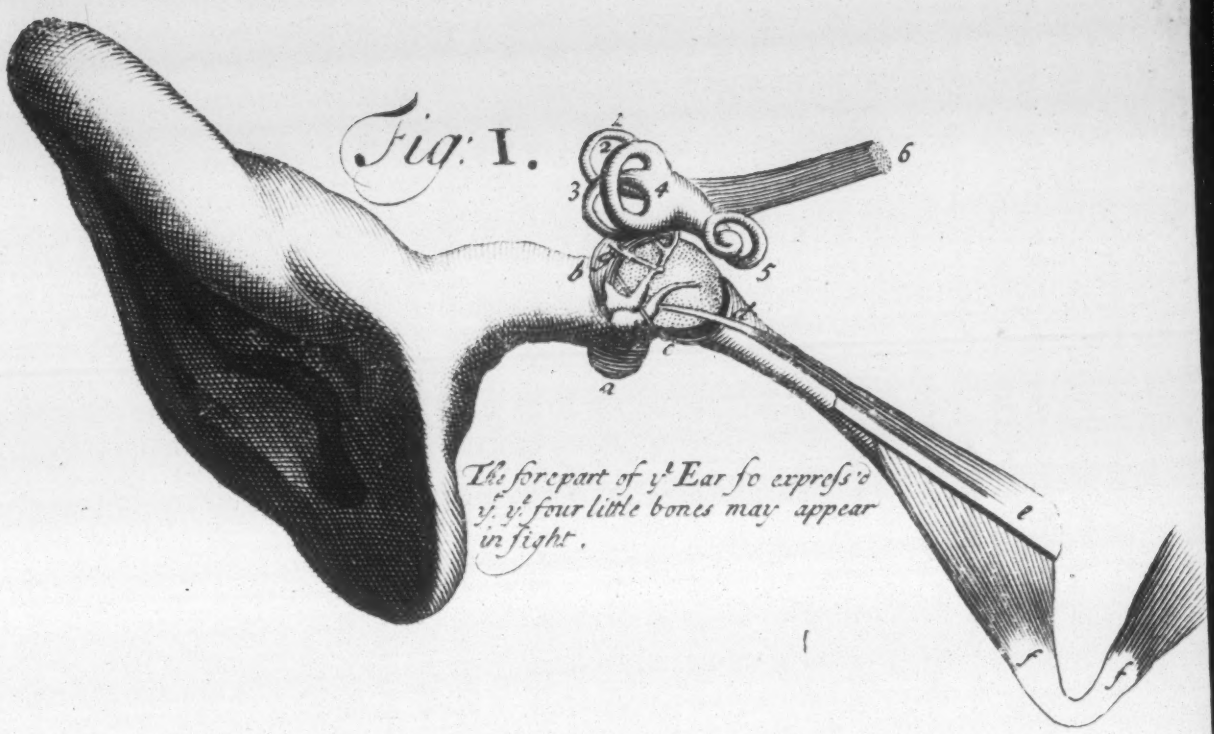


Fig: I.

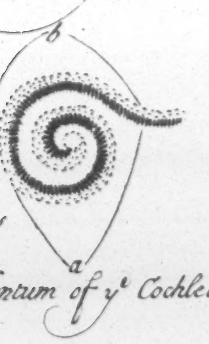
The forepart of ye Ear so express'd y. y. four little bones may appear in sight.

e 2 Inside out

Fig: V.

The Labyrinth towards ye Cerebrum.

Fig: VII.



ntum of ye Cochleæ.

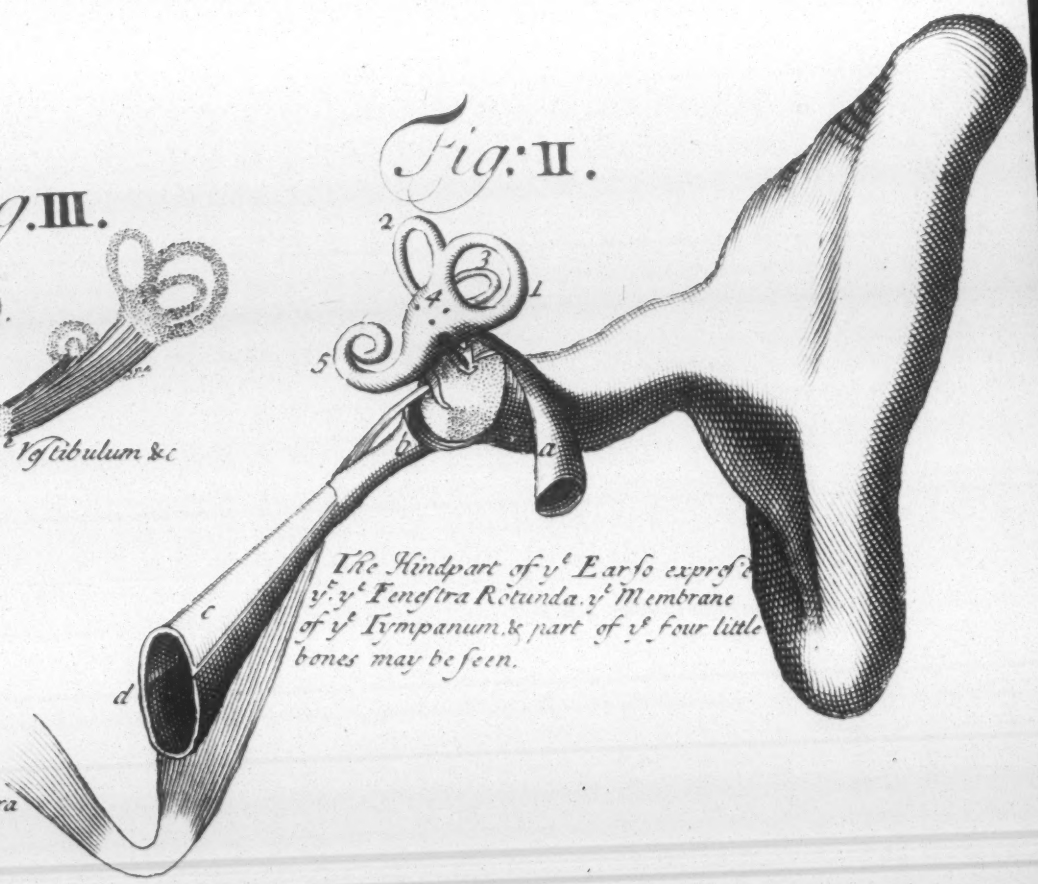
Fig: VIII.

The Portio Mollis of ye Auditory Nerves with all ye Zones of sound.

Fig. III.

The Membrane of ye Vestibulum &c

Fig: II.

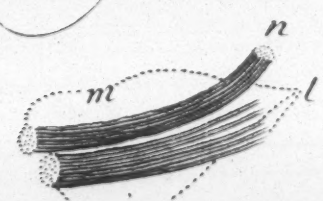


The Hindpart of ye Ear so expres'd y. y. Fenestra Rotunda. ye Membrane of ye Tympanum & part of ye four little bones may be seen.

Fig: X

The Portio Mollis & blood Vessels.

Fig: XI.



The Portio Mollis with ye Portio dura both according to their Natural size.

r from Dr Willis. Valsalva &c.

Fig. IV. *Shows the bony Channels through which the Auditory Nerves paſs.*

A. The Common Channel.
B. Two from the Sinuſſes which meet at the End of it.
C. The Particular Channel.
D. The *Foramen* by which one Part of that Channel opens in a Cavity of the *Cranium.*
E. The *Foramen* by which another Part of that Channel opens into the Mammillary and Styliform Proceſs, which the Fourth Table deſcribes by the Letter *g.*

Fig. V. *Explains the ſame Channels, together with ſeveral other Parts of the Ear,* Euſtathius's *Tube,* &c.

A. *Fallopius*'s Aquæduct, or the particular Channel.
B. The Common Channel.
C. *Euſtathius*'s Tube.

Tab. VIII. Fig. I. *Explains the ſemicircular Channels, as they have Relation to the* Cerebrum, *which for the better Underſtanding are delineated in the Figure.*

a. The greater Channel.
b. The leſſer Channel.
c. The common Channel.
d, d. The leaſt Channel.
e. The proper Orifice of the great Channel.
2. The proper Orifice of the leſſer Channel.
3. The common Orifice.
4. The ſtraiter Orifice of the leaſt Channel.
5. The broader Orifice of the ſame.

Fig. II. *Expreſſes the whole Cavity of the Labyrinth,* &c.

a. The ſemicircular Channels, which may be known by the ſame Letters as mark'd before.
f. The *Veſtibulum.*
g. The *Foramina* in the Bone of the *Veſtibulum* for the Entrance in of the Nerves, which are Five.
h. The Channel of the *Cochlea.*

Fig. III. *Shows the ſemicircular Channels, not crooked in their natural Bends, but ſtretch'd lengthways.*

i. The proper Orifice of the leſs Channel.
k. The proper Orifice of the greater Channel, in which, before that Channel ends, it is turned into an Orbicular Cavity.
l. The common Orifice.
m. The broader Orifice of the leaſt Channel.
n. The ſtraiter Orifice of the ſame.

Fig. IV. *Shows the whole Labyrinth equally as in* Fig. II. *but inverted.*

1. The great Channel.
2. The leſſer Channel.
3. The leaſt Channel.
4. The Channel of the *Cochlea,* as in *Tab.* IX. *Fig.* I.
O. The *Feneſtra Ovalis.*
P. The *Feneſtra Rotunda.*

Fig. V.

Fig V. *Shows the Labyrinth as it regards the Brain, as it is demonſtr* Fig. II. *The Orifices of the Channels need not be taken Notice of ag they being in* Fig. I.

q. The *Feneſtra Ovalis*, which is obſerved open in the Bottom of the *Veſtibulum*.

r. The Orifice of the Scale of the *Veſtibu*

Fig. VI. *Shows the Two Scales of the* Cochlea, *with their Progreſs and t Orifices.*

s. The Orifice of the Scale of the *Tympanum*, or the *Feneſtra rotunda* it ſelf.

t. The Orifice of the Scale of the *Veſtibulum.*

u. The Scale of the *Tympanum.*

x. The Scale of the *Veſtibulum.*

Fig. VII. *Demonſtrates the* Septum *or Partition of the* Cochlea, *and the t Subſtances thereof.*

a. The harder Subſtance, or ſpiral *Lamina.*

b. The ſofter Subſtance, or Zone of the *Cochlea.*

Fig. VIII. *Shows the* Portio Mollis, *with every Part of it, and all the Zon of Sound, ſhown in the ſame Situation in which they appear.*

c. Portio Mollis.

d. That Part of it which enters the *Veſtibulum* divided into Five Branches, and ſtretches it ſelf into the Membrane of the *Veſtibulum.*

e. Another Part of the *Portio Mollis*, which enters the *Cochlea.*

f. Three Zones which are carried forward from the Membrane of the *Veſtibulum* into the ſemicircular Channels.

g. The Zone of the *Cochlea*, the ſame as d ſcribed in the preceding Figure by t Letter *b.* which is probably nothing e but an Expanſion of that Part of the *Po tio Mollis* marked *e.*

h. That Part of the ſame Zone which placed betwixt the Orifices of the Sca of the *Cochlea*; and which is continue to the Membrane of the *Veſtibulum.*

Fig. IX. *Shows the ſame as the former, but demonſtrates the Zones in an oppo Poſition. If neceſſary, conſult* Fig. IV. *with the foregoing.*

Fig. X. *Shows the* Portio Mollis *of the Auditory Nerves and the Blood Ve ſels; together with that deſcending from the Brain to the Labyrinth. A the Expanſion of the ſame into the Membrane of the* Veſtibulum, *a from thence into the Zones of the ſemicircular Channels. See* Fig. VI *and* Fig I. II.

Fig. XI

XI. *ſhows the ſame* Portio Mollis, *together with the* Portio Dura, *both expreſs'd in their natural Size.*

The *Portio Mollis.*
ive nervous Branches, into which one
vided Part of the ſaid Portion enters the
eſtibulum; but the other enters the
ochlea.

m. The *Portio Dura.*
n. The ſame turning from the Common Channel into the Particular.

b. IX. *This is contrived ſo, that the whole Structure of the Organ of the Ear may be ſeen at one View.*

Fig. I. *Expreſſes the fore Part of the Ear towards the Face, yet a little inclining towards the hind Part of the Head, ſo that the Four little Bones may come in Sight.*

The Extremity of *Fallopius*'s *Aquæduct*, rom which the *Portio Dura* of the Audiory Nerves breaks out.
The bony Portion, from the Partition of he *Maſtoide Sinus*, to wit, that to which he ſhort Proceſs of the *Incus* is bound.
The Muſcle of the leaſt Proceſs of the *Malleus*, the Muſcle of the leſſer Proceſs ot being to be obſerved, becauſe hid under the *Incus* and Auditory Paſſage.
The Muſcle of the great Proceſs, which extended the whole Length of *Euſtahius*'s Tube, freed from its bony Chanel.
The fore Breadth of the Cartilage of *Euſtahius*'s Tube, into which the fleſhy Fires of the preceding Muſcle are inſerted.
The new Muſcle of *Euſtathius*'s Tube.
The Stirrop Muſcle freed from its bony Channel.

1. The great ſemicircular Channel.
2. The leſſer ſemicircular Channel.
3. The leaſt ſemicircular Channel.
4. The *Veſtibulum*, in the Arch or Bone of which, according to our Inſpections into this Part, only two *Foramina* appear; but of thoſe Five, which tranſmit their nervous Branches into the ſame Cavity, the Three remaining *Foramina* fall under our View in the following Figure.
5. The Channel of the *Cochlea.*
6. The *Portio Mollis* of the Auditory Nerves, ſending one Part of it towards the *Cochlea*, but the other, which is divided into Five Branches, ſtretching into the *Veſtibulum*; of which we cut off Two, leſt they ſhould hide the Appearance of the *Foramina.*

g. II. *Shows the Ear from the hind Part towards the* Occiput, *but yet a little inclining forward, ſo that the* Feneſtra rotunda, *the Membrane of the* Tympanum, *and the Four little Bones, may be ſeen.*

allopius's Aquæduct.
The Beginning of *Euſtathius*'s Tube.
The hind Breadth of the Cartilage of that Tube.
The End of the Tube.
The great ſemicircular Channel.
The leſſer ſemicircular Channel.

3. The leaſt ſemicircular Channel.
4. The *Veſtibulum*, where the Three *Foramina* appear out of the Five. Then under theſe *Foramina* another great *Foramen* offers it ſelf, which is the *Feneſtra rotunda.*

5. The

5. The Channel of the *Cochlea*, among the Turnings of which is left that perforated *Sinus* from the leaſt *Foramina*, out of which that Part of the *Portio Mollis* which regards the *Cochlea* enters the by the ſaid *Foramina*; which, for the ter Illuſtration, are deſcribed larger they naturally are.

Fig. III. *Explains the Membrane of the* Veſtibulum, *alſo the Zones of* Cochlea *and the ſemicircular Channels, annex'd to the* Portio Mollis *the Auditory Nerves, in their natural Size, and the ſame Situation in which they appear.*

Of the Diſeaſes of the Ear, from the Sieur de St. Hilaire, *and others.*

THE chief Diſeaſes that attend the Ear, are Ear-ach, Inflammation, Ulcers, Worms, extraneous Bodies, that enter the Ear; Excreſcencies of Fleſh that ſtop the Paſſage, Tumours, and the Abſceſs of the Parotide Glands, the Loſs of Hearing, Deafneſs and Noiſe or Tingling in the Ear.

The *Ear-ach*, or *Pain in the Ear*, is a very common Accident, always produced by the Irritation of the Membrane of the *Tympanum*. This Irritation determines the Animal Spirits to flow into the nervous Fibres of that Membrane, which is done with that Rapidity, that it makes Divulſions in the nervous Fibres; ſo that that rending or tearing the Part gives Occaſion to the Senſe of Pain. We may ſee by that, that whatever is capable of breaking the Union, in irritating the Membrane which cloathes internally the Conduit or Channel of the Ear, may excite or raiſe the Pain. Likewiſe it may be occaſioned by an Inflammation, joined to a Senſe of Heat and Pulſation, by an acrid Salt Humour, a vitiated *Lympha*, impregnated with much Acidity, and by the ſame Humour from whence the Ear-wax is formed, or the natural Mucous, when it is too acrid, or too much ſtop'd in its Motion; for notwithſtanding its Thickneſs, the yellow Colour, and its Bitterneſs in Adults, it becomes an excellent Va rary.

The *Ear-ach* which proceeds from Cauſes is without Heat, and without P ſation; but ſharp, acute, and vio Worms which enter into the Ears, or w are bred there, occaſion cruel Pains in Teeth.

The Pain is known by the Patient's A count of it. As to the Cauſes, in the flammation the Pain is lively, ſharp, beating like the Pulſe, and the Outſide the Ear is ſometimes red. The proper S of a viciated *Lympha* are to be met with the continued Pain and Weight of the H thoſe Pains of the Ear-wax being too a are perceived by the Tenſion of the P In ſhort, the Manner of the Pain being or leſs violent, or longer or ſhorter in C tinuance, diſcovers the Cauſe.

The Ear-ach is oftentimes ſo inſuppo ble, that whole Nights and Days are ſp without Sleeping. The Accidents are troubleſome ſometimes, that an acute Fe happens, Watchings, Deliriums, Convu ſions, and Swoonings, by Reaſon of the ternal Membrane of the Channel of the E whoſe whole Texture is interwoven w Nerves, and which like the *Periosteum* bound upon the Bone.

If it happens that this Contexture be forcibly ſhaked, ſo that the Spirits precipitate themſelves into the Nerves of the Heart and other Parts, the Blood is then pump'd with much Strength into the Arteries, that it is carried with great Violence to the Head, and occaſions new Obſtructions that encreaſe the Inflammation.

The Fever that happens ſometimes in great Ear-achs, is occaſioned by the acrid Salts of the Wax, or oily Part of it, that mixes with the Blood, and increaſes its Motion.

The Watchings proceed from nothing but the great Agitation of the Animal Spirits, which being forcibly moved by the Shaking of the Nerves, flow without ceaſing into all the Organs of Senſe.

The *Delirium* is occaſioned from the Spirits which paſs from one Track to another in the Brain, with an irregular and tumultuous Motion, repreſenting to the Soul all Things at once, and at the ſame Time impreſſing a Confuſion of Idea's.

The Convulſions happen from the acrid Salts irritating the Membrane of the Channel of the Ear, and exciting thoſe little Jolts or Shakes to make it contract, which communicating afterwards to other Membranes by the Continuity of Nerves, the Convulſion paſſes into the other Parts of the Body.

The Ear-ach is much leſs ſenſible or painful when nothing but the outward Part of the Ear is inflamed, than when the Inflammation poſſeſſes the bony Channel, becauſe the Membrane of the Ear is ſtrongly tied to the Bone. If an acute Fever attend the *Ear-ach*, with Deliriums, Watchings, Convulſions, and Faintings, theſe are mortal Signs, which have ſomething more at the Bottom, that affect the Nerves ſenſibly. Young People are ſubject to Inflammations in the Ears, and old People to other Diſaffections.

The Inflammation always ſeizes on the Channel, which is cauſed either by an Obſtruction of the Glands, or by the Acrimony of the Ear-Wax: By the Obſtruction, when the nutritious Juices are too thick, ſo that they cannot flow freely thro' the little Pipes of the Glands of the Ear. In ſhort, the Ear-Wax becomes ſometimes ſo acrid, that it lacerates or rends the Glands in Pieces, ſo as to give Opportunity for the Blood to extravaſate and cauſe Obſtructions.

In this Diſtemper there is an exceſſive Heat in the Ear, a continued Pain, very violent, with Pulſation, and ſometimes a Redneſs is obſervable without, attended with an Inflammation that is more or leſs deep. When the Inflammation is great, it ſtretches it ſelf to the Cheeks and the Temples, and the deeper it is, the quicker is the Pain and Pulſation, when the Fever, the Delirium, and the ſame Time the convulſive Motions are preſent. This Inflammation changes and degenerates into an Abſceſs, which leaves behind it an Ulcer. It is to be much ſuſpected during the Suppuration, becauſe of the Fever and the Pain which communicated themſelves to the Brain and the Membrane, and produced conſequently the Delirium. When the Abſceſs is hollow, the *Pus* corrupts and waſts away the *Tympanum*, without occaſioning a Deafneſs.

The Ulcer of the Ear is either True, or that ſeems ſo in Appearance. The True Ulcer comes from an Abſceſs attending an Inflammation, or a too acrid *Lympha*, that is careous, and exulcerates the internal Channel. The ſeeming Ulcer is, when there is a Sort of *Sanies* or Corruption that flows from the Ears, ſometimes without any preceding Pain. This Flux laſts a long Time, and when it ſtops it produces different Symptoms in the Head and Brain, from which the Continuation of the Flux heals. It is frequently obſervable in Children, that a Running in the Ears more or leſs of Children frees them from ſeveral Diſeaſes.

If you ask why Ulcers of the Ears laſt ſo long, it is anſwer'd, becauſe the Matter which flows from the Ulcer irritates the Membrane of the Ear, under which are the Glands. This Irritation, cauſed from the Inflammation of the Glands, is becauſe they diſcharge by their excretory Ducts a Seroſity or acrid Salt *Lympha*, which enters afterwards the Ulcer. In this conſiſts the Difficulty of curing Ulcers of the glandulous Parts; for the Glands of the Ears being inceſſantly irritated by the Acrimony of *Pus*, there flows an acrid *Lympha*, which conſtantly waters the Bottom of theſe Ulcers, which makes them ſo difficult to cure.

The Ulcers of the bony Channel are yet harder to cure than the Ulcers of the cartilaginous; becauſe thro' the bony Channel towards the Skin of the *Tympanum* the *Pus* cannot drain off but with great difficulty; but on the other Hand, the cartilaginous Channel tending towards the *Concha*, it makes the *Pus* go off freely, without ſtopping, as in the other Channel.

The True Ulcers of the Ears, which are ſo laſting or inveterate, degenerate eaſily into *Fiſtula's* or corroding Ulcers, giving Occaſion to the Membranes to produce a fleſhy Exceteſcence called *Hyperſarcoma*, which ſtops the *Auditory Paſſage*. The whiter the *Pus* is, and of a moderate Conſiſtence, it is better than the immoderate ſtinking ſanious Matter.

It ſometimes happens that there are Worms in the Ears after Suppurations, of which there are ſeveral Remarks in the Journals of Learning from Abroad and at Home. Several celebrated Authors have aſſign'd their Generation to the Corruption of Blood, or the nutritious Juices; but the Moderns ſay, that all Inſects have their Riſe from Eggs; and therefore thoſe Worms which are found in the Ulcers of the Ears and elſewhere, come from little Eggs in the Blood, which are hatch'd by the Heat of the fermenting or putrified Humours.

It is not long ſince, as our Author ſays, that a Man voided by his Ear, after a large Suppuration, a thick fœtid Matter, with ſeveral little Animals in it, which were very like *Millepedes* or Hog-lice; but we cannot find out whether theſe little Inſects eat their Way through the Membrane of the *Tympanum*, or were diſcharg'd by the acrid ſaline Matter that flows from the Ear.

The fleſhy Excreſcencies proceed from the Quantity of nutritious Juice which ſwell the Membrane of the Ear, the Tumour of which Membrane fills the Channel of the Ear. Theſe Excreſcencies are ſubject to become cancerous, when the nutritious Juice acquires a ſufficient Acrimony.

Extraneous Bodies which have got into the Ear are difficult to take out, becauſe the bony Channel is oblique, and enclines towards the Membrane of the *Tympanum*. Beſides, the Ear-wax is ſo viſcous and gluey, that it holds any ſmall Bodies faſt within its Cavities.

The *Parotides* are red painful Tumours with Heat, and a Pulſation which the *Parotide* Glands are ſubject to, from whence they derive their Name. Theſe Tumours are either critical, when they happen in ſuch a State of the Diſeaſe as is eaſy to the Patient, or elſe ſymptomatick, when they come in the Beginning with little Force.

The Tumour of the *Parotides* is cauſed by an Obſtruction, as all other Tumours are; for when the Courſe of the Blood and the *Lympha* are not ſtop'd, and that the Figure, the Size and Motion of the Blood, and the Structure of the Pipes by which it flows remain the ſame, it is impoſſible there can be any Obſtruction in the Parts, becauſe the Juices continue fluid. It is not therefore the Fluxion that makes the Tumour; but, to ſpeak the Language of the Ancients, it is the Congeſtion, or rather, it is becauſe the nutritious Juices are obſtructed, that the Tumour is produced. It is then the Change of the Figure of the nutritious Particles, and the Alteration that happens to the little Tubes of the Parts, which produces the Tumours; and as the Subſtance of the Parts is different in Structure, ſo there ariſes different Sorts of Tumours.

The *Parotides* are not without Danger, by Reaſon of their Nearneſs to the Brain, and the Continuity of the Nerves. Thoſe which attend a Fever are always pernicious when the Fever does not abate, or they do not ſuppurate; for if the Tumour of the *Parotides* is conſiderable, you ought not to wait the Suppuration, but rather to open it, for fear the Patient ſhould be ſuffocated.

The Hearing is hurt by Diminution, in the Hardneſs of the Ear, or Difficulty of Hearing, by Abolition in Deafneſs, or by Depravation in the Noiſe or Tingling of the Ear. It is leſſen'd when there is nothing but a confus'd Perception: It is depraved when they underſtand or hear Sounds different from what they are; and in ſhort, it is aboliſh'd or loſt when the Ear receives no Impreſſion of Sound at all.

The Hearing is leſſen'd or loſt, Firſt, by the external Ear, when it is cut or wounded, ſo that you hear only a confus'd hoarſe

Noiſe,

Noiſe, and are obliged in that Condition o hold your Hand like a Horn, and apply to the Ear to repair that Defect.

Secondly, when the Auditory Paſſage is bſtructed, which comes not only by exernal Means, which fall into the Ears, as itch, Cherry-ſtones, *&c.* but by a natural ll Conformation, Excreſcencies, the Swelng of the Glands, and by the Ordure from he Ear, which reſts there a long Time and ardens.

Thirdly, by the Vice of the Membrane f the *Tympanum*, being either broke by iolent Cauſes, or torn off by internal Exlcerations, which is the Cauſe of Deafneſs. f the deaf Perſon can hear by ſtriking upn a Stick between his Teeth, that Malady ies not in the Auditory Nerve, but in the Membrane of the Auditory Channel.

Fourthly, by the Vice of the Auditory Nerve, when it has an ill Conformation, nd inſtead of the internal Ear, it is otherwiſe diſtributed: The Patient in that Caſe s deaf, and commonly dumb from his Birth. The ſame happens if the Nerve is obſtructed, o as to hinder the Influx of the Animal pirits, or by a ſubtle *Lympha* inſinuating ſelf, as in catarrhous Affections and acute Diſeaſes, which terminate in a critical Hemorrhage.

Fifthly, by the Vice of the Membrane, or he ſame Nerve which enlarges it ſelf in the abyrinth, to wit, when the Fibres are either roke, or ſeparated, or relax'd, or vitiated ome other Way, that deſtroys their natural one and Condition; for the Want of the Contraction of the Membrane renders it ncapable to be moved or ſhaken by the Impulſe of the Air.

The Noiſe or Tingling of the Ear, is when e do not underſtand the Sounds we hear perfectly; and the Reaſon proceeds from he Reception of Air which is confin'd in he *Tympanum*, the *Cochlea*, and the Labyinth. This Air is naturally very little, or oo much agitated; but it receives ſome gitation from the external Air which obliges it to force the membranous Expanſion of he Nerve which lines the *Cochlea* and the abyrinth, when the Hearing is performed s we have laid down before. And when ithout any Impulſe of the external Air he internal Air is moved contrary to Nature by ſome internal Cauſe, the Sounds againſt Nature diſturb the Hearing. If the Motion is quick and ready, as when the Strings of a Lute are well wound up, and forcibly ſtruck, they drive by their Vibration the external Air before them, ſo that they make an acute Tone or Sound; but if on the other Hand the Motion of the internal Air is ſlow and confus'd, as that of the String or Chord of the Inſtrument that is not ſufficiently ſtretch'd, it makes a grave heavy Sound.

The Cauſe that agitates the implanted Air, proceeds from certain Particles or ſubtle Vapours in the Maſs of Blood, which mixing themſelves with that Air, and being incloſed in thoſe Mazes, they excite by their Agitation unnatural Sounds. The rapid Motion and Impetuoſity of the Spirits which ſhake the Auditory Nerve, and the too violent Pulſation of the little Arteries that are diffuſed within the Ear, likewiſe agitates the internal Air, and repreſents a Sound that it is a Stranger to, or unacquainted with; from whence it comes that in Diſeaſes of the Head, and upon the Acceſs of a Fever, the Tingling and Singing of the Ear are frequent, becauſe the Blood is extraordinarily moved, and the little Arteries beat more forcibly than uſual. From whence it is, that a Hemorrhage of the Noſe in Fevers is ſometimes preceded by a Noiſe in the Ears, which is then occaſioned by the Swelling and Effervelcence of the Blood collected together in the neighbouring Parts of the Ear, and which beats forcibly againſt the internal Ear.

Medicines againſt the Tumour of the Ears called the Parotide.

FOR curing of the *Parotide*, we are to endeavour to reſolve, ripen, or ſuppurate, by the following Means; and never to apply cooling and repelling Medicines, which may prove of too dangerous Conſequence. We ought likewiſe to adminiſter internally the Volatiles to open the Glands, as Antimony Diaphoretick, volatile Salts of Hartſhorn, Vipers, *&c.* together with Diureticks, to oblige the ſaline *Serum* to ſeparate by Urine.

Take freſh Butter, two Ounces; Oil of Camomil and Lilly, of each an Ounce; Ointment of *Althea*, half an Ounce; and a little Wax: Make theſe into a Liniment, which apply with Wool upon the *Parotide*.

Take Roots of *Althea* or Marſhmallows, and Briony, of each two Ounces; Leaves of Rue and *Origanum*, of each a Handful; Camomil and Melilot Flowers, of each one Pugil; boil all in Hydromel, and then add the Meal of Fenugreek ground to Powder, two Ounces; *Florentine* Orrice in Powder, Camomil, and Melilot, of each two Drams; Oil of Dill and Rue, of each one Ounce; make a Pultiſe, which apply to ripen the Tumour.

Take Lillies and Onions, roaſted in the Aſhes, of each three Ounces; two Yolks of Eggs, Hogs Lard, Baſilicon, of each one Ounce; Linſeed Flower, one Ounce and half; make a Pultiſe to ſuppurate and bring the Tumour to a Maturity.

For Inflammations and Ulcers of the Channel of Hearing or Auditory Paſſage.

WE muſt begin the Cure of the Inflammation of the Auditory Paſſage as the *Phlegmon* in other Parts, by Remedies that remove the Obſtructions, and diſpoſe the Humours to be carried off by Sweat; for which proper Topicks are to be made uſe of.

Take Oil of Bitter Almonds, mix'd with Mucilage of Linſeed. Camphire with Oil of Egg, drop'd into the Ear, abates the Inflammation.

A Cataplaſm made with Crums of Bread, Yolks of Eggs, Onions, Camomil, and Melilot, is excellent, when the Inflammation would ſuppurate.

The Injections compos'd of *Ariſtolochia*, Hellebore, *Coloquintida*, and Cows Milk, with Honey, drop'd into the Ear, heal perfectly well the Ulcers; and ſo does the Tincture of Aloes made with Spirit of Wine.

Ointment of *Ægyptiacum*, or the green Balſam, mix'd with Wine, or with the Urine of a young Child, is an efficacio Remedy for deep inveterate Ulcers of Ears. The Cicatrice or Skinning of Ulcer is made with common Medicines.

You ought not be too haſty in curing U cers of the Ears in thoſe who are of a mo Conſtitution, as Women and Children, cauſe in ſtopping the Suppuration, ſeve Accidents may happen. It is therefore b ter to take ſome Time in them, that t may have Leave to ſuppurate; for th ought to be looked upon as Iſſues t cleanſe the Blood of the acrid and mal nant Matter, which being otherwiſe check produce malignant Fevers, and oftentim Death.

Of Pains and Worms in the Ears.

IN the Ear-ach attended with an Inflam mation, or from the Apprehenſion Fear of the Inflammation, the Medley Confuſion that happens is wonderful.

Take of the Juice of Great Houſeleek, tw Drams; Oil of Scorpions, Earth-Worm Camomil, of each one Dram; mix all t gether, and drop of it into the Ear; or f the Ear with Cotton imbibed in the f Oils. But when there is no Suſpicion an Inflammation, or any Sign, the otalgi Spirit of Mynſicht is excellent.

And when the Pains proceed from Worm let them be deſtroy'd by the following R medies. Take of Aloes and Myrrh, of ea two Drams; *Coloquintida*, half a Dra Tops of Wormwood, half a handful: B them all in Wine, and inject of this in the Ear with a Syringe.

Take Salt or Sugar of Tin or Lead, r it with the Ear-Wax and Oil of Amb of each equal Parts, and drop it into Ear; or the Roots of Sow-bread bruiſed a ſtrained with Oil of bitter Almonds Spirit of Wine. The Smoak of Tob blown into the Ears preſently relieves inveterate Pains. So Oil of Scorpions *Millepedes* are very good.

Agu

ginſt Noiſes and Singing in the Ears.

Ake Oil of Ants aud Hog-lice, mix'd with a little *Caſtor*, or Spirit of Urine, which ſome Musk has been infus'd; dip ittle Cotton or Wool in this, and apply the Ear for an inveterate Tingling.

Take White Hellebore and *Caſtor*, of each o Drams; a Dram and half of *Coſtus*, o Scruples of Rue; *Euphorbium*, half a ram; bitter Almonds, one Ounce; boil in Oil of Rue for an Hour's Time; drop this hot into the Ear.

Take White Hellebore, three Drams; Leaves Laurel and Rue, of each half a Handful; ſh-Leaves, a Handful; boil all in Oil of tter Almonds, and ſtrain. With the ſaid iquor make an Injection into the Ear.

Againſt Deafneſs.

Ake Oil of Amber rectified two or three Times, the oftner the better, or Saffron and loves infus'd in Juice of Sow-Bread, and op'd into the Ear; or a Decoction of *Caſtor*, niper Berries, and Vinegar: So Snake or Serpent's Fat, with Laurel Leaves, and *Hungary* Water, makes a moſt incomparable Mixture for the ſame Intention.

Take Aſh-tree Leaves, Rue, White Hellebore Roots, boil'd in Oil of bitter Almonds; or Oil of Turpentine and Aniſe mix'd together; and either is a good Remedy.

Take White Hellebore, *Caſtor*, Pellitory of the Wall, and Nitre, of each equal Parts; boil them in good Wine to the Waſting of the Liquid, then ſtrain, and drop of this into the Ear.

Take Aloes, one Dram; *Coloquintida* Seed, a Scruple; Savine Berries, one Scruple; an Ox Gall, enough to form 'em into Troches or Paſtilles, which dry and diſſolve in Juice of Onion when you apply to the Ear.

Take an Oil made of Leek-Seed, bitter Almonds, and Laurel, of each two Ounces; Spicknard, *Caſtor* and *Coloquintida*, cut, of each two Drams; Juice of Rue aud White-Wine, of each one Ounce and half; mix and diſgeſt in *Balneo* twenty four Hours, boil to the Conſumption of the Moiſture, ſtrain it off, and in this diſſolve Six Grains of Musk. This Oil put hot into the Ears, has relieved thoſe that have been born Deaf.

The Diſeaſes of the Ears, from Barbett, &c.

THE Pain of the Ears proceeds either from a hot or cold Diſaffection, or from a Solution of Continuity, which is often ſucceeded by an Ulcer; for a cold Diſaffection, nd what attends it, beſides the common and rticular Medicines, this may be applied ith very good Succeſs.

Take Oil of Rue and Henbane, of each lf a Dram; diſtill'd Marjoram, half a ruple; *Caſtor*, Six Grains; Saffron, four rains; mix them. The Smoak of Tobacco own thro' the Bole of a Pipe put into the r, hath done good to many for the Pain of e Ears and for Deafneſs. Oftentimes alſo Decoction of Cloves in Claret hath relieved, if two or three Drops of it be put warm into the Ear, and the Ear ſtop'd afterwards with a Clove. Two Drops of the following Spirit, Morning and Evening, drop'd into the Ear is excellent.

Barbett's *Spirit for the Ears.*

TAke Ants Eggs, one hundred; *Caſtor*, Pulp of *Coloquintida*, Marjoram, Savine, Wormwood, Rue, of each a Handful; Cummin, Fennel, Caraways, and Aniſeed, of each three Drams; Bay-Berry Husks pull'd off, Juniper Berries, of each half an Ounce; Pomegranate Rinds, Six Drams; Roots of black Hellebore, round *Cyprus*, Radiſhes, Sow-

Sow-Bread, Onions, eight; bitter Almonds, two Ounces; infuse them Fourteen Days in a due Quantity of Spirit of Wine, then distil them in *Balneo Mariæ*.

In a hot Disaffection, First, we ought to divert or revulse the Flux of Humours, by Bleeding, Purging, Blistering, Clysters, *&c.* then use the following Medicines: Take Breast Milk, two Ounces; Whites of Eggs well beaten, half an Ounce; Saffron half a Scruple; Goose Grease dissolved, two Drams; crude Opium, Five Grains. Mix them.

Or take Oil of Violets, Sweet Almonds, Rose Vinegar, of each an Ounce; Leaves of Mallows and Mandrake, of each one Handful; Heads of Poppy, two; Flowers of Dill and Camomil, of each two Handfuls; Linseed, three Drams; boil them in Cows Milk, for a Fomentation to wash the Ears with.

The Flux and Pain being abated, what yet remains may be discuss'd by those Remedies set down already for the Pains proceding from a cold Disaffection. Where the Inflammation apostumates, which is to be learned from the Pulse being feverish, and by the continual Encreasing, must be assisted by suppurating Medicines; for which, take *Unguentum Basilicon*, two Drams; Oil of Linseed, three Drams; mix them. Or, take Goose Grease, Oil of Sweet Almonds, White Lillies, of each two Drams.

Or else take Roots of White Lillies, an Ounce and half; a large Onion roasted in the Ashes, and beaten together. Add to them Marshmallow Flower, half an Ounce; Linseed, Six Drams; fresh Butter, an Ounce and half; Oil of Camomil and Linseed, of each half an Ounce; Saffron, half a Dram. Make it into a Pultise.

The Apostume being broke, the Ulcer is first to be mundified; for which Purpose are convenient, Honey of Roses, of Centaury, the Juice of Smallage, Fennil, Beet, Onions, Leeks, the Decoction of Agarick, *Lupins*, Urine, Sage, Oxes Gall, *Unguentum Ægyptiacum*. Then must be used those Medicines that may dry and consolidate the Ulcer.

Take Roots of round Birthwort, half a Dram; Flower-de-Luce, a Scruple; Ceruse washed, Tutty prepared, of each a Dram; Myrrh, Sarcocol, Litharge of Gold, of each two Scruples; Iron Scales, a Scruple; Honey of Roses, as much as is sufficient: Make it into an Oyntment.

Where Worms come in an Ulcer from an impure Matter, the following are convenient to kill them, *viz.*

The Juices of Wormwood, Centaury, Arsmart, a Decoction of *Coloquintida*, White Hellebore, Oxes Gall, Oil of Wormwood, Rue, bitter Almonds, *&c.* Or Take Aloes, Myrrh, of each two Drams; *Coloquintida*, half a Dram; Tops of Wormwood, half a Handful: Boil them in White-Wine for an Injection to be syring'd into the Ear.

A Specimen of Observations upon the Muscles: Taken from that noble Anatomist Nicholas Steno.

THE Anatomical Discoveries I had an Opportunity of making last Year, concerning the Structure of the Heart, in my private Dissections made both at *Leyden* and *Amsterdam*. To oblige the Curiosity of many Persons of Note, my particular Friends, I was then prevailed upon to engage my self to publish them, together with their proper Figures, with the first Conveniency that occur'd. And since several among them were so generous as to offer me all the Assistance they were capable to give, or procure me for the carrying on such a Design, I was very willing, as far as in me lay, to direct the chief of my Studies that Way, and accordingly proceeded.

In the First Dissection of the Heart, I discovered the following Things: First, that there is no *Parenchyma* belonging to the

the Heart, which is different or distinct from its Fibres. Secondly, that none of the Fibres terminate in the Centre; but being inserted about it, each of them ascend contrary Ways to which they descended; and whilst I was endeavouring to satisfy my self farther in Relation to some other Things, I found that the Ducts or Course of the Fibres were all of them the same, neither strait nor circular, but a little incurvated about the Middle. By these Discoveries, I thought I had now chalk'd my self out a plain Path, that would lead me into a perfect Knowledge of the Heart, being satisfied that many Doubts and Objections that had been canvass'd by the Learned with some Heat, by these few Discoveries would soon vanish into Smoak. But I was no sooner enter'd upon an exact Description of every Part, and a Scrutiny into every particular Fibre that was in the Heart, but I found my self every Day involv'd in new Difficulties, and those of such a Nature, as were not likely to be removed without a previous Knowledge of the Muscles.

Humane Enquiries and Observations are frequently subject to this Failing, that they treat despicably, or at least neglect and leave in Obscurity what is most worthy our Notice; and on the other Hand exalt and set up to the highest Degree that that is not near so much deserving. Of the first we have an Instance in the Glandules, and of the latter in the Heart, which has been stiled no less than the Residence of the innate Heat, the Throne of the Soul; nay, it has by some been made the Soul it self. The Heart has been saluted with the specious Titles of being a King, nay the Sun, and I know not well what, when upon a strict Enquiry into the Matter, it will be found to be no more than a Muscle.

I am not ignorant, that *Galen* tells us in expres Words, that those who assert the Heart to be a Muscle, understand nothing, neither what *Hoffman* says of those that deduce the Motion of the Heart from its *nervous Plexus*; namely, that he will rather laugh at them than refute them. But had these great Men not been more sollicitous in a great many Respects of setting out and ushering into the World their Principles and Opinions, they would have been less rash in their Judgment, and in a much fairer Way of discovering the Truth; for Want of which they have exposed themselves instead of others, to the just Censures and Laughter of the judicious World. Wherefore, whatever those Gentlemen might laugh at, both Reason and Experience teaches us, that those who, after the great *Hippocrates*, assert that the Heart is a Muscle, and that its Motion is perform'd with the Concurrence of the Nerves, are in the right of it.

The most celebrated *Harvey*, as also *Sylvius*, as they were both Persons of uncommon Experience, so they have both maintained this Opinion; yet so as that the first did not fully discover the Fibres, and the latter being diverted otherwise from pursuing what he had so well begun, both left that Part unfinish'd. But that I may set the Thing in its true Light, I will insert here a short Account of such Observations as in all Probability will render the History of the Muscles much more distinct and clear than what has been done hitherto, more especially in Reference to the Use of the Fibres, according to their Situation and Structure. Experience does not agree in all Respects with what has been left us Anatomical Authors concerning the *Thorax*, and therefore it is the less to be wonder'd at when we find them of so various and different Opinions about it. To lay down all the controverted Points raised on Account of the Muscles that serve for Respiration being far beyond our present Scope, it will be sufficient, in order to remove them, for me to show you what Anatomical Experience furnishes us withal.

They differ very much about the Number of the intercostal Muscles, and there are some who would not allow them any Place among the Muscles; for no other Reason, but because the true Course of the Fibres could not be sufficiently traced or discovered. This is most apparent in the external, where they have taken very different Muscles for one and the same. 'Tis true, they all of them perform the same Office; but notwithstanding this, they ought to be looked upon as distinct Muscles, which being different in their Originations, have also their Tendons differently placed, and make different Angles with the Ribs; as these which de-

deſcending from the tranſverſe Proceſſes of the *Vertebræ* into the ſuperior Side of the inferior Ribs, may very properly be called the *Coſtarum Levatores*. And here the exterior Tendon, which is contiguous with the *Vertebræ*, appears to be leſſer; but that which is conjoin'd with the Ribs expands it ſelf on the interior Surface of the oppoſite Part. The moſt ingenious *Spigelius* calls theſe the Beginning of the Intercoſtals; he, as far as I know, being the only Anatomiſt who has obſerved this Correſpondency betwixt the *Vertebræ* and the Intercoſtals.

But how can that be called the Beginning of an intercoſtal Muſcle, which is not at all betwixt the Ribs; for it does not conjoin any Rib, but the *Vertebræ* to the Ribs: Beſides that, in the inferior Ribs, there is ſcarce any ſuch Thing as Intercoſtals, unleſs it be the laſt Point of the inferior Tendon, wherewith it makes an Angle there in the inferior Parts: Neither muſt that Part of external Intercoſtals be neglected here, which conjoins the bony Extremity of the ſuperior Rib with the Cartilage of the inferior.

What further might be added concerning the Length of the fleſhy Part, and the Inſertion of the Tendon, are obvious from the Doctrine in General of the Structure of the Muſcles. The Uſe or Office of the Muſcle called the *Sacrolumbus* has been involv'd in Obſcurity, becauſe they were ignorant of the true Courſe of the Fibres. They commonly make this Muſcle ariſe from the *Os Sacrum*, and the ſpinous Proceſſes of the Loins; whereas it is only its leaſt Part that has its Beginning there; all the reſt, which is much the greater Part, taking its Original from the Ribs. However theſe Fibres are not carried from the inferior Rib to that which is next above it, but ſome of them take their Courſe, ſome over Three, others over more, that lie betwixt, or are Intermediums to them. Neither what is ſent forth by One is inſerted to One Fibre only, but ſome provided for Three, others for Five, and others again for Seven Ribs; and in the ſame Manner each of the Tendons that is conſpicuous, not ſatisfied with that fleſhy Part which is furniſhed by One, does in ſome Places gather up the Fibres that are emitted by Five Ribs.

And notwithſtanding this ſeeming C fuſion, they may eaſily be ſeparated and monſtrated diſtinctly in a Subject of an different Bulk, by making a ſtrait Sectio as to deſcend from the Tendon backwa which will afford you a Sight of the var Bellies; and then by a lateral or tranſv Section, from the Space or Interval betw the Ribs, ſo as to continue your Sect upwards, endeavour to diſcover the Num of the Tendons of one Belly; for each tire Belly allots to ſeveral Tendons every its Part or Share, as each entire Tendon ceives its Part from ſeveral Bellies.

The triangular Muſcle proceeds from bony Extremities of the true Ribs to middle Line of the *Sternum*; but not ways in the ſame Tract or Courſe of its bres; for the ſuperior makes an acute gle with the *Sternum*, whereas thoſe that ceive them, the lower they are, the leſs a are the Angles alſo. The Hiſtory of *Diaphragm* is involv'd in many Doubts Falſities; for neither are all its Fibres joined, or run into its Centre; neith the Principle of its Motion in the Ce but one of the Extremities of the Fibr in the *Vertebræ*, the other in the Circu rence, where it is conjoined with the F and the Appendix of the *Sternum*; but middle Membrane is made by the Fibres the Tendons, with ſome intermediate F as in the *Muſculus Digaſtricus*, running in a ſtrait Line, but with various Turni by a moſt admirable Contrivance of ture.

They ſay it has only two Shoots, w are inſerted into one *Vertebra* only; could never meet with fewer than three, have often ſeen four of them; but al as many as there were of them, they fix'd into the ſuperior Bone of the two *tebræ* next adjacent to each other, and about the Middle, from whence they ſe to deſcend a little through the Middle *Linea Aſpera*. Not long ſince, in the ſection of a Dog, where there were ſuch Parts belonging to the Diaphrag obſerved the leaſt of them on the Left inſerted into the third *Vertebra* of the but the Right, which were three in

r, and each of them larger, to be con-
ued from the third to the fourth.
The Courſe of the fleſhy Parts, they tell
, is like the *Radii* in a Circle, but very
congruouſly; for ſuppoſing it might bear
me Reſemblance in thoſe that adhere to
e Circle of the Ribs, thoſe which have
eir Tendons joined together towards the
ck, have nothing like it. Beſides that, it
heres to the reſt, not by the Intervention
the Fibres, but by the Membranes; for
you ſeparate the *Pleura* and the *Perito-*
um, that whole Part of its Circumference
hich is betwixt its Roots and the Ribs
ill be conſpicuous.
And here I muſt ask Pardon of all the
natomiſts in general, and beg Leave to
l them, that I could never as yet meet
th any Figure of the Diaphragm in their
natomical Tables or Cuts, by which I
ght be convinc'd that they had made an
ct and true Anatomical Deſcription of it.
far are they all from having given us a
e Repreſentation or Delineation, either
the Courſe of the Fibres both in the fleſhy
rt, and the tendinous Membrane, or of
Inſertion of the Tendons into the Ribs
the *Vertebræ*; nay not even of that
erture deſign'd for the Tranſmiſſion of the
mach. Not to mention here what other
ious Things are remarkable in this Place.
What Diſputes have not the Anatomiſts
ſed in their Books concerning its Begin-
g and End? Whereas, after all, the Dia-
agm does not attract or draw one Part
another; for even when it is extended to
utmoſt, it is not extended ſtraitwiſe, nor
provided with a *Trochlea* or Pulley, nei-
does it adhere to any Thing unleſs to
Cartilago Enſiformis; ſo that when it is
ed, it is moveable; for, Who can deny
that the *Vertebræ* are immoveable?
d the Ribs being rigid, are kept ſo by the
ſcles that elevate them.
here are beſides theſe many other Things,
ch, together with the Hiſtory of Reſpi-
on, have remained in Obſcurity to this
for Want of an exact Scrutiny into the
ſcles; but what ſeems moſt of all ſur-
ng to me is, that they have aſſign'd thoſe
ſcles for the Motion of the Ribs, the op-
te Extremity of which, if it were im-
eable, ſome other Muſcles muſt be exten-
ded; ſo that the Part unto which they ad-
here muſt, in Reſpect to the Ribs, be taken
for the immoveable Part.

But without inſiſting any further upon this Matter here, I will now give you an Account of the Uſe of ſome Muſcles in Reſpiration, which will appear to come up to the Certainty of a Mathematical Demonſtration, to ſuch as will be at the Pains to examine what Sorts of Angles are made betwixt thoſe Muſcles that belong to the Back, Ribs, and *Sternum*. The *Levatores* of the Ribs, in Conjunction with the external Intercoſtals, firſt move the Ribs both upwards and downwards. Secondly, they dilate the Interſtices of the Ribs. Thirdly, they contract or ſtraiten the cartilaginous Intervals, and draw upwards the Cartilage of the inferior Rib towards the bony Extremity of the ſuperior.

The triangular Muſcle draws upwards the lower bony Parts of the *Sternum*, towards the Extremities of the true Ribs, contracts the Intervals of the Cartilages, and is ſubſervient in dilating the Interſtices of the Bones. The Office of the interior Intercoſtals is firſt to pull down as it were the *Sternum*. Secondly, to draw aſunder the Cartilages from one another. Thirdly, to draw the ſuperior Ribs nearer to the inferior, and render their Interſtices narrower or ſtraiter. The Muſcle called the *Sacrolumbus* draws the ſaid Ribs farther and nearer to one another.

The Sinuoſity of the Diaphragm is not ſo much contracted as its Convexity is ſtraitned; for all the Lines which may be conceived from the *Vertebræ* to the reſt of the Circumference, both when it is looſe and languid, and when it is extended and turgid, are incurvated in ſome Part or other; ſo as that the convex Part looks towards the *Thorax*, and the concave to the *Abdomen*. Theſe, the more tenſe they are, the more convex they appear alſo, and the wider is the *Abdomen*, and the ſtraiter the *Thorax*; ſo that in Inſpiration, the Bottom of the *Thorax* is more depreſs'd, but aſcends in Exſpiration.

Meeting with ſo many various Doubts concerning the Doctrine of the Muſcles, I was almoſt deter'd from proceeding any further in the Scrutiny of the Heart; but hap-

pening to have a dead Rabbet at Hand, I laid hold of its Legs, and ſeparated its Muſcles, with a full Reſolution to try whether there was any Hopes left of attaining any greater Certainty in this Point than before. The firſt I happened to light upon being cut off and divided with one ſtrait Section from one Extremity to the other, did repreſent it ſelf in the moſt ſimple and plain Figure or Shape that ever I ſaw afterwards; for the oppoſite Tendons gather'd at the Extremities, as ſoon as they came to the fleſhy Belly, were divaricated in ſuch a Manner, that one being expanded thro' the ſuperior, and the other through the inferior Surface of the middle Belly, grew ſlender by Degrees, the carneous Fibres met in a ſtrait Courſe, each of them being contiguous to the tendinous Fibres.

This done, I purſued my Scrutiny in other Muſcles at different Times, and of different Sorts, all which fully confirm'd me in the Truth of my former Obſervations. In all of them I conſider'd the ſame Figure as in the firſt, yet not all after the ſame Manner; for in ſome I obſerved it ſingle, in others compounded, and that alſo after ſome different Way; but in none of all the reſt found it ſo exact as in the temporal Muſcle, which being diſſected from the Proceſs of the Mandible to the Skull, ſo that the Knife followed the Tract of the Fibres, I feaſted my Eyes with a pleaſing Spectacle; for the inferior Tendon aſcending into the Middle of the fleſhy Part, is gradually attenuated into a *Lamina*, unto which the Fleſh adheres on both Sides, almoſt in the ſame Manner as the ſmall Feathers do to the Wings of volatile Animals.

The Fleſh that ariſes from the interior Side of the Tendon is next contiguous to the Skull, and the oppoſite Part has a Tendon expanded over it, by the Intervention of which it is alſo inſerted into the Skull. I ſtand almoſt amaz'd how thoſe Anatomiſts who have obſerv'd a Tendon to proceed from the Middle of the temporal Muſcle, ſhould not be induc'd thereby to enter into a further Examination by the Tracts of the Fibres. There are ſeveral other Muſcles beſides highly remarkable for the moſt artificial Contrivance of their Structure.

So I proceeded to the Scrutiny of the Tongue, where Anatomiſts tell us that the Extremities of the Muſcles terminate or degenerate into a Subſtance of a peculiar Kind. But upon a ſtrict Examination, I obſerved that this peculiar Subſtance was muſcular, a Thing obſerved by ſome others, and alſo by *Nicholas Maſſa*, in his Introduction to his Anatomy, who being obliged to own theſe Muſcles in the Tongue, by its various Motions, tells us therefore that it is not to be diſtinguiſh'd, but only known by its Obſervations.

But it is an Error to pronounce a Thing impoſſible to be done becauſe it ſeems ſo to us; for he that will enter into a ſtrict Examination of the Tongue, may there diſcover from its very Tip to the Root or Baſis all the diſtinct Series of Fibres, which are only threefold, in the whole Body of the Tongue. Firſt, the exterior Fibres, which are next adjacent to the ſuperior Surface of it, running a direct Courſe according to the Length of the Tongue. Of the others, which poſſeſs all the middle Part, there are two Sorts; one which deſcends from the ſuperior Part of the Tongue; and the other which enters from the Middle towards the Sides of it in Men. Theſe two Sorts are diſpoſed in certain Series's which receive one another alternatively, each of them ſcarce containing more in Thickneſs than one Fibre; ſo that they lie as it were *Stratum ſuper Stratum.*

The ſuperior Part of the Tongue it ſelf keeps the Tendons encloſed betwixt the exterior Tunick and the fleſhy Parts; but it ſuffices to have given you a Hint of this laſt, it being beyond our Scope at this Time to expatiate or enter into an Explication of the Opinions relating to the Taſte, and the various Motions of the Tongue, in the Pronunciations of different Letters.

It would be a tedious Piece of Work to enter upon a Recital of all the Muſcles, and to give an Account of all the Differences that occur in them; however it will not be beyond our Scope to draw certain Concluſions from Obſervations. Firſt, in all the Muſcles there are to be obſerved, Arteries, Veins, Nerves, Fibres, Membranes; and ſome add alſo Lymphatick Veſſels; which laſt, tho' I have frequently ſeen about the

Muſ-

uſcles, I could never meet with any of em within the Muſcles. Secondly, you all never meet with any Muſcle in which ch ſingle Fibre does not extend it ſelf on oth Sides within the Tendon; whether all eſe Tendons on both Sides, or on one Side nly, are gather'd together into ſtrong Ten- ons, or whether they are expanded into a embrane, or degenerate into a bony Ri- dity, which happens as well to the Begin- ing as the End. Thirdly, the fleſhy Part not a *Parenchyma*, but the ſame Fibrils hich, being cloſely conjoin'd within one nother, do form the Tendon, being oſer, conſtitute the fleſhy Part; and in this enſe it is rightly expreſs'd, that a Tendon one continued Body, from the Beginning the Muſcle to the End. Fourthly, it is ery hard to meet in any one Muſcle with Fibre which makes one ſtrait Line; but ch of them is divided at leaſt into three ines, which comprehend two alternative ngles. Neither are theſe Three Lines al- ays ſtrait, but oftentimes the fleſhy Part, in the *Sphincters*, which I hope no Body ill deny to come within the Number of e Muſcles; and ſometimes the Tendon al- o, as when the Fingers are bent together ithin the Hand, do make a curved Line. ifthly, the before-mentioned three Lines of ach ſingle Fibre in the ſame Muſcle are not lways of the ſame Length, tho' all the Fi- res, when taken together, ſcarce ſhow any Difference in their Extenſion in moſt Muſ- les. But that every Thing relating to this Head may be put into a clearer Light, it will be requiſite we ſhould here inſert a articular Deſcription and Denomination of he ſeveral Parts.

Each ſtrait and ſimple Muſcle therefore hich admits of Sections, according to the Courſe of its Fibres, has two Tracts, one rait, and the other tranſverſe, yet not ſo as o divide the *Planum* tranſverſely, quite hrough its Middle, but ſtretching this from ne Side to the other, as that the Tendons emain entire with the Fleſh; ſo that to di- tinguiſh what is different in it ſelf by di- tinct Names, we will call the *Series's* of he ſtrait Fibres *Ordines* or Ranks, and the ranſverſe, *Verſus*, or Lines or Rows.

The Fibres of the ſame *Ordo* or Rank are n the ſame *Planum*, and repreſent a *Paral- lelogrammum obliquanculum*, or the Figure of a *Rhomboides*; the two oppoſite Parallels of which, in that Place where they comprehend acute Angles with the other Parallels, they are on the Outſide of the Angles extended into oppoſite Parts, and theſe Parallels ſtretching without the Figure repreſent op- poſite Tendons, which divaricate different Ways. The reſt of the Parallels that lie betwixt them, or fill up the *Area*, repreſent the Situation of the fleſhy Part. I hope I need not ask Pardon, if, in treating of Phy- ſical Matters, I underſtand Phyſical and not Mathematical Lines, tho' at the ſame Time I make Uſe of Mathematical Names; for theſe Lines are ſo far from having no Latitude, that each of the fleſhy Parts make as many Parallelograms, and the two oppoſite Col- lections of the Tendons repreſent the *Tra- pezium*.

But leaving theſe Niceties to the Mathe- maticians, it is to be obſerved here, that in either of theſe Tendons, tho' never ſo thin, there are as many Filaments lying upon one another as there are fleſhy Parts or Diviſions in the Belly, which ſhows how much more compact the Tendons are than the fleſhy Parts. Secondly, that the interior Fila- ments of the Tendons are always ſhorter than the exterior; whence it is that the Fi- bres, taken all together, where they are car- neous, are alike unto one another in the ſame Rank. Thoſe of the tendinous Parts on both Sides, retain a certain Inequality which may not improperly be compared to the *Syringa* of the Ancients; ſo that if you make a narrow Inſpection into each Rank, you will find three Figures; to wit, two *Syringa's* oppoſite to each other on the Re- verſe Side, and the Middle a *Parallelogram- mum*.

The *Verſus*, Row or Line of the Fibres, is commonly diſtinguiſhable into three Fi- gures not lying upon the ſame *Planum*, *viz.* one of the fleſhy Parts, which are Right An- gles, Triangles, or *Trapezia's*, according to the different Figure of the entire Tendon; ſo that one may eaſily determine the Quan- tity of each of the Fibres in the Lines.

From the Lines or Rows thus placed up- on one another, ſo that their Middle *Planæ* make a Kind of a Parallelogram, ariſes the Muſcle where the Compages of the *Verſus* is

diſcovered by the Series of the Fibres in their Ranks; there being in a Muſcle as many Lines as there are Fibres in a Rank; and in the uttermoſt *Verſus* of the oppoſite Tendons there may be obſerved a great Variety in the Extenſion of the ſame Row. In the reſt, the more they recede from the Extremity nearer to the Middle, the more the Inequality of the oppoſite Tendons decreaſes by little and little.

Every Muſcle may truly and aptly be divided into its Belly and its Tendon, *viz.* the Middle and the Extremities; for as to what relates to its Beginning and End, and the Ligament, Controverſies ſtarted thereupon will never be determined without a certain Foundation was laid before-hand.

If I may be permitted to ſpeak without Reſerve upon this Head, I would have no Body have any Regard either to the fleſhy Parts or to the tendinous, or trouble himſelf much about the Inſertion of the Nerve, but would have him call that Extremity which is immoveable the Beginning or Principle, and the other, that is moveable, the End. And ſince the Extremities ſometimes changes, ſo that the Extremity which is moveable at one Time becomes immoveable in another Poſition of the Body, I would rather refrain theſe Names, and reſt ſatisfied with calling them Extremities, becauſe to ſpeak properly, neither of them can challenge the Name of being either the Beginning or the End.

For it is not to be imagined as if the Generation of the Muſcle was ſuch as to proceed gradually from one Part to another, this being inconſiſtent with the Motion of the Blood; neither is the immoveable Extremity at all Times the ſame in one Muſcle; and if that is to be the Beginning towards which the Motion of the reſt is made, the Belly muſt be the Beginning in all the Muſcles; becauſe, according to the different Situation of both Extremities, the Motion is made toward the Belly, and the Inſertion of the Veſſels is in the Belly. So that in caſe we admit of a ſucceſſive Regeneration of the Parts, the firſt Beginning muſt be looked for in that Place where the Veſſels are inſerted.

There are Abundance more Queſtions of this Nature, upon which much Time and Paper has been ſpent by Authors, which, when they come to the Touch-ſtone, are found to be framed rather for Ornament or Diſcourſe-Sake than to diſcover the Truth, or promote the Good of Mankind. Therefore that we may ſtick cloſe to what is moſt certain, we will retain the Diviſion of the Muſcle into the Belly, or the Body of the middle Fleſh, and into the Tendons, or the Extremities; for there is not the leaſt Reaſon to aſſert that a Muſcle, the fleſhy Parts of which are fix'd into the Bones, without any intermediate Tendon, as it happens in Part of the temporal Muſcle, and in ſeveral Muſcles of the Limbs, does therefore want one of its Extremities. Is it not certain, that in the firſt Generation of the Parts, thoſe that are now Bones were then Membranes? And it is frequently obſervable in many of the volatile Animals, that the Tendons turn into Bones, where the fleſhy Parts are not conjoined with the Bones by any other tendinous *Medium* than as the Fleſh of the Muſcle is inſerted into the Skull.

There are therefore two Tendons in every Muſcle, conſiſting or compoſed of the *Verſus* or Rows of the tendinous Fibres, which ariſing from the oppoſite Parts, and being expanded thro' the oppoſite Parts of the Belly, grow thicker and thinner by Degrees. Theſe Muſcles are either ſingle, the Expanſions of which are conſpicuous on the outſide, or elſe compounded, where, at one of the Extremities, it enters thro' the Middle of the fleſhy Part, and at the other, it enters the Fleſh on both Sides; ſo that this Muſcle ſeems to be a Compoſition as it were of two Muſcles.

The Length of the Belly is not always to be meaſured by that of the carneous Fibres, becauſe the longeſt Belly has oftentimes the ſhorteſt Fleſh. There is a Membrane which not only ſurrounds the Muſcle tranſverſely, but with the ſame Courſe inſinuates itſelf betwixt each of its Fibres. The Action of the Muſcle conſiſts in its Conſtruction, but thence it does not naturally follow, that the ſtrait interjacent Part of the Muſcle between its Extremities ſhould become ſhorter; but that each of the Fibres of the ſame Muſcle which lie betwixt the ſaid two extreme Points, ſhould be ſhorten'd.

The

That which is contracted is not the Ten-
on, but the Fleſh that is comprehended be-
wixt the tendinous Expanſions, which by
is Contraction produces this Effect, that the
wo or more oppoſite *Plana* of the Belly do
pproach nearer to each other, ſo that the
endon is not the firſt Principle of Motion,
either is the Motion owing either to the Be-
inning or the End of the Muſcle; but in
what Manner this Contraction is accom-
liſh'd it is hard to determine, conſidering
here are many who deduce it from the Re-
letion of the Fibres, ſome others from the
nanition of them, and others again there
re who have Recourſe to both. I ſhould
erhaps be looked upon as too forward and
old, if I ſhould pretend to ſet up for an
rbitrator in ſo difficult a Point, and there-
ore am rather inclined to declare, that I am
ot ſatisfied yet as to the true Cauſes or Man-
er of this Contraction; but as Things
xplained by *Simile's* are very acceptable to
ome, I will give you one here, which per-
aps may not be foreign to the Purpoſe.

Thoſe that are imployed in driving Poſts
nd Trees into the Ground for the Founda-
ion of large Superſtructures, make uſe of
certain Engine that is pull'd upwards by
many Hands, with the Help of many Ropes,
ach of which is pull'd by a ſingle Hand.
his Engine bears no ill Reſemblance to a
uſcle after its being diſſected tranſverſly
hro' the Fleſh. The Ropes are not unlike
he Tendons, which are longer according
o the Diſtance the Men are at. The Weight
hat is fix'd to the Ropes is the moveable
art, and the Men the carneous Fibres; for
uſt as the Men, when they pull all the
opes at once, make themſelves ſhorter, and
o move the Weight; ſo the carneous Fi-
res being contracted, whilſt they draw the
ndinous Fibres, move the moveable Part;
ut this being only a *Simile*, I ſhall inſiſt
o further upon it.

The ſhorter the Fleſh is in a long Belly,
he ſtronger is the Force of Contraction,
ecauſe the Number of the Fibres is the
reater. Whatever Part does neither want
ny Part that is neceſſary in a Muſcle, nor
as any Thing elſe that does not belong to a
uſcle, and beſides this, has a Structure
uch as is ſuitable to a Muſcle, muſt of
Courſe come under the Denomination of a
Muſcle. Neither is it requiſite it ſhould be
actually ſubject to the Command or Deter-
mination of the Will; for there are many
Muſcles which, in Reſpect of many Things,
are never moved by the Determination of
the Soul, as may be proved by ſeveral Muſ-
cles of the *Larynx*, of the Tongue, and of
thoſe belonging to the Back.

How far the aforeſaid Structure of the
Muſcles may be able to lead us upon fur-
ther Enquiry, a right Underſtanding of the
Cauſes as well as the Cures of ſome certain
Diſeaſes, will appear more fully from what
follows. I told you before, that the Fleſh
was contained betwixt the tendinous Expan-
ſions, and it is not long ſince that I obſer-
ved in a Turky-Cock, in ſeveral Muſcles of
the Legs, the tendinous Expanſion ſo far
freed from the Fleſh that lay underneath it,
that it only adhered to it by ſome very thin
Fibrils, which by the leaſt Touch or Force
would break aſunder immediately, and then
the Tendon appeared like unto a Membrane.

The carneous Extremities which had been
continued to this Tendon before, in that
Part where they appeared ſomewhat white,
but firmer, came off from the reſt of the
fleſhy Part, and contained alſo ſomething
of a Moiſture about them. This Obſerva-
tion I made only once in ſuch a Cock; and,
What Reaſon can be given why ſuch a
Thing ſhould not happen ſometimes alſo in
the humane Muſcles? For whenever the
Motion is weakened or impaired in ſome
certain Part, or elſe quite aboliſh'd, ſuch a
Thing, I ſay, might be the Cauſe of ſuch a
Seceſſion, either wholly or in Part, of the
Fleſh from the Tendon. It has been the
general Opinion hitherto, that the Fibres
were extended directly in a Muſcle from
one of its Extremities to the other; which,
if it was, it would follow that its Motion
muſt be impaired by every tranſverſe Section,
but not from a ſtrait one. It is evident,
that when the Muſcle ſhould be divided in
its Middle tranſverſly, all its Fibres muſt be
cut aſunder; but it is no leſs evident alſo,
from the Structure of a Muſcle, that a
Wound may be given with a broad Iron
tranſverſly thro' the Middle of the Muſcle,
without any Detriment to its Motion, pro-
vided

vided the Iron Inſtrument ſtrikes betwixt the ſame Parallels, without touching upon the oppoſite Expanſions.

On the other Hand, as to all theſe ſtrait Sections, as there are an infinite Number that don't happen to remain within the Compaſs of two Ranks of the Fibres, do impair leſs or more the Motion, together with the Fibres, according as the Knife happens to light.

What has been alledg'd here concerning the Muſcles, if applied to the Heart, is ſufficient to prove the firſt Propoſition, *viz.* That the Heart is actually a Muſcle. I will treat of this under Three Heads :

Firſt, That in the Subſtance of the Heart we meet with nothing elſe but Arteries, Veins, Nerves, Fibres, and Membranes; neither is there any Thing elſe to be ſeen in a Muſcle. Not to mention Fat and Bones, becauſe all Hearts are not provided with them, neither do they belong to any Muſcle; and what has been delivered concerning the *Parenchyma* being diſtinct from the Fibres, is rather owing to the Invention than the Experience of ſuch Anatomiſts.

I have in ſome Subjects obſerved certain bright Ducts diſperſed thro' the Surface of the Heart, which upon Diſſection were found to be Nerves, and not *Lymphæducts*. The *Plexus* of the Nerves, as deſcribed by *Fallopius*, is confirmed by Experience, as well as the Diſperſion of the Nerves thro' the Surface, and their penetrating into the inner Parts of the Heart.

Secondly, when I was once upon the Scrutiny among the Fibres of the Heart, I found one which was carneous in the Middle, but tendinous at both Extremities, which is commonly what is obſervable in all the Fibres of the Muſcles.

In the Heart, as well as any other Muſcle, there is an uniform Courſe of the Nerves, for they are all about the Middle of the fleſhy Part inflected or incurvated like a Bow, and make no other Angles but with the Tendon on both Sides, and theſe ſtrait and tranſverſe. Thoſe who pretend to have a more than ordinary Inſight into the Deſigns of Nature, juſt as if they were of her Cabinet Council, have made theſe of a circular Figure. They ſeem to be ſomewhat intricate, but are neither confuſed nor inextricable, becauſe all that belong to the Left Ventricle are contorted after one and the ſame Manner.

Neither is there any inſurmountable Difficulty in diſcovering the Labyrinth and Turnings of the Right Ventricle, if you proceed with Caution. The ſame might indeed be more aptly repreſented in Figure than explained in Words, nevertheleſs I will endeavour to give you ſome Idea of it.

At firſt Sight, when you caſt your Eyes upon the Heart, after it is freed from its external Membranes and Fibres, it ſeems as if the Courſe of all the Fibres were the ſame on all Sides, *viz.* obliquely from the Baſis to the Cone; but when afterwards you ſeparate theſe fleſhy Parts one from another, you will find but few of them reach to the Cone. As ſoon as the firſt deſcends but never ſo little from the Baſis, I call here the firſt thoſe that are conſpicuous in the Left Ventricle, on its fore Part, where they meet with the Right, they are incurvated, ſo ſoon as they are carried under the reſt towards the Left; and thus the next following Fibre deſcends a little longer before it is incurvated, and when incurvated, it ſtill paſſes over the next following, which is not to be inflected but below the Place where the next preceding was incurvated.

This ſame Method or Courſe takes Place in almoſt all the Fibres, which I know not how to explain to you more aptly than as a *Parallelogrammum*, form'd of Fibres which has a parallel Situation betwixt them, if you turn one of the ſhorteſt Sides to which the Extremities of the Threads are annex'd, ſo as to make an entire Circle; for here you may obſerve the ſame Figure of the Threads that are incurvated and aſcend one over another.

But if you ſuppoſe more Parallelograms of the ſame Kind, and make them concur or meet, in order to compoſe a *Parallelipedum*, and allow to one of the *Hedra* or Seats to which the Threads are faſten'd ſuch a Situation as I told you of; and beſides this, let the ſame ſhorter *Hedra*, which were oppoſite to one another before, be placed on the ſame *Planum*, in ſuch a Situation that the Middle and lower Courſe of the Threads may repreſent a Bow, you will have no further Occaſion to complain about the confuſed Series of the Fibres in the Heart.

But as, to give you a more clear and live-
y Repreſentation of each of theſe Things in
articular, we ſtand in Need of ſeveral Fi-
ures or Delineations; therefore it would be
o little Purpoſe here to enter into a large
Detail of the ſeveral or rather various
Courſes of the Fibres in the Walls of the
Ventricles, in what Manner, by the Con-
ourſe of the exterior Prominencies, they are
ramed, and what a moſt curious Figure the
arious Reſolution of the Cone ſets before
ur Eyes; as likewiſe the Divarication of
he fleſhy Parts from one another into the
pposite Parts; with many other Things of
his Nature, which will be apparent to any
ne that with Induſtry and Patience will
et about the Inſpection of the Heart it ſelf,
r conſult ſuch Figures as have been drawn
om the Life by the beſt Anatomiſts.

The middle carneous Portion of the Fi-
res forms the Belly of a Muſcle, as well as
e Bellies of the Heart; the Subſtance
hereof, tho' it be obvious enough, has ne-
ertheleſs bred more Controverſies than any
ther Part that I know of. They diſtinguiſh
into its Baſis and its Cone, which hither-
o they have imagined to be very thick;
hereas its middle Point, or the Centre that
left in the Middle of the incurvated Fi-
res, is ſo very ſmall as ſcarce to come up
o the Bigneſs of a Pin's Head, nothing elſe
eing to be ſeen there but the Concourſe or
Conjunction of the exterior Membrane with
ne interior.

The Tendons which receive the Extremi-
es of the fleſhy Parts are partly in the Si-
uſſes, and partly conſpicuous in the Promi-
encies, where they form certain Valves,
nd degenerate alſo into the Subſtance of
rteries; for the Veins being contiguous to
ne of the Tendons of the Auricles, have
o other Commerce with the Heart but what
by Means of the Auricles: Here it is you
uſt look for the Beginning as well as the
nd of the Muſcle. This laſt is repreſented
y the Orifice of the Pulmonary Artery, and
y the Valves of both the Ventricles; as
kewiſe by Part of the *Aorta*, to wit, that
art which forms the *Valvula Mitralis*; and
e firſt by the Tendons, which give the re-
aining Portion of the *Baſis* to the great
rtery.

I will not pretend to ſhow you in what Place it is that the Tendon expands it ſelf either betwixt or above the fleſhy Parts, or give you a Draught of the Valves in the right Ventricle of Birds, nor enter upon a particular Recital of that great Variety I have obſerved in the different Parts of different Animals, becauſe I want Figures or Cuts to repreſent them.

I have ſeen a ſmall Bone in the Heart, not only of Animals of a conſiderable Bulk, but very often alſo in leſs; but it is not to be met with in all Animals, and where it is to be found, it is nothing elſe but a Part of the Tendon which is degenerated into a bony Solidity.

Juſt as it has been obſerved in the volatile Kind, that in the Middle of a Tendon of their Legs there is ſomething that reſembles altogether a Bone in its Solidity. This is obſervable not only in theſe, but in Animals of other Kinds; *viz.* that one of the Tendons of many of their Muſcles, either wholly, or at leaſt in Part, degenerates into Bone, which as it is plainly demonſtrable in the Skull, it is no leſs ſo in thoſe of the Hands and Feet. What Reaſon therefore can be given, why the Bone taken out of the Heart of a Stag ſhould have any other peculiar Virtues attributed to it than to any other Bone of the ſame Animal, I muſt confeſs I am yet to ſeek.

The proper Membrane of the Heart interſects its Fibres by a tranſverſe Courſe of the Fibres, and inſinuates it ſelf betwixt them, exactly after the ſame Manner, as we obſerve it in the Membrane of the Muſcles. Now ſince all the true Properties appertaining to a Muſcle are applicable alſo to the Heart, I judge the Heart may truly be ſtiled a Muſcle, and that it may challenge this Name by its Tendon, fleſhy Part, and Nerve. All which, though it may ſeem directly contrary to what *Hippocrates* has aſſerted, to wit, *That the Strength of a Muſcle is not in its Tendon, but in the fleſhy Part*; yet to thoſe that will compare both the due Order of his Words and his true Senſe with what has been aſſerted by us, will find that they are ſo far from being contradictory to our Opinions, that there is a very great Congruity betwixt them.

Were

Were I not almoſt ſecure that there is ſcarce any Body but what is ſenſible how many Doubts may be ſolv'd, and Queſtions anſwer'd with Eaſe, by this one Propoſition only, I could without much Trouble add here a long and ample Catalogue of others of this Nature, ſome of which have not only puzzl'd the Ancients, but even *Harvey* himſelf, and ſome other Moderns; but I am willing to content my ſelf in this ſmall Tract with ſome few only, which as they are of the moſt Moment, ſo they flow immediately and naturally from the beforeſaid Propoſition.

If therefore it is certain, as that it is ſo beyond all Diſpute, that we are convinc'd both by our Senſes and Reaſon it ſelf, *viz.* that there is nothing wanting in the Heart that is to be met with in a Muſcle; and further, that nothing is found in the Heart but what is contained in a Muſcle, how then can the Heart be any longer a Subſtance of its own Kind, and conſequently a certain determinate Subſtance, as the Fire, the Seat of innate Heat, and the Soul; or the Procreator of ſome certain Humour, as of the Blood, any more than the Productor of certain Spirits called vital? For if the Heart is the ſame with the Muſcles in Reſpect of all the contained Parts, the Subſtance alſo of the Heart and its Veſſels, to wit, the Contained, with the Containing Parts, muſt be likewiſe of the ſame Nature with that of the Muſcles; for the ſame Thing being furniſhed to either of them, and that by the ſame Veſſels, muſt produce the ſame Subſtance; to which you may add alſo, that in either, *viz.* in a Muſcle as well as in the Heart there is to be obſerved one and the ſame Action, that is, the Contraction of the fleſhy Part; the neareſt or immediate Cauſe of which, whether it can be different from the neareſt or immediate Cauſe of the Contraction of the Muſcle, conſidering the great Similitude and Agreeableneſs there is betwixt all the Organs, I will leave to t Determination of others that may perh be more quick-ſighted in Matters of th Nature than my ſelf.

But it may be thoſe that ſet up for A vocates for the Heart will tell me, that this has Relation only to the Subſtance, b not to the Cavities of the Heart, whi contains the nobleſt Part of Life, that is, t Blood; but if I am able to judge any Thi of the Matter, this Argument has more Show than Weight in it. But be that as will, my preſent Buſineſs was to exam into the Subſtance only, ſo as to demonſtr all the *Phænomena* belonging to the Moti of the Heart from the Courſe of its Fibr and this I think I have in ſome Meaſure pe formed, but muſt ſubmit my ſelf to t Cenſure of the Publick; but that I may n be totally accus'd of having ſaid nothing the Motion of the Heart, which I jud foreign to this Deſign, I will add the fo lowing Propoſition.

When the Fibres of the Heart are ſho ten'd near the *Baſis* and their Beginning, End, that is, the *Cone*, muſt of Neceſſity drawn upwards, becauſe the Fibres defc to the laſt to the Cone, and the Cone cends the contrary Way; for as they defc in the Right Ventricle, on the Inſide fr the *Septum*, and aſcend obliquely backwa thro' the exterior Surface, they raiſe the B tom of the Right a little towards the Ba and conſequently the Heart becomes ſhort and alſo rounder in the Right Side.

But becauſe the Walls will become t ſhorter and thicker, therefore the Cavi of the Ventricles muſt alſo be made ſtrai ſo that when the Heart is round, it is more capacious at that Time than when it of an oblong Figure. Neither for the ſa Reaſon does its Rotundity proceed from great Dilatation of the Blood, neither there a Diaſtole at that Time.

Of the Height or Stature of Charles the Great, *by the* French *called* Charlemaine, *King of the* Franks, *and First Emperor of* Germany. *Written by* Marquardus Freherus.

IF a Speculation of this Nature was thought worthy the Regard of that eminent Philoſopher *Pythagoras*, as we find it was when he imploy'd himſelf make an Enquiry after the Length of *Her-les*'s Body, as *Plutarch* and *Gellius* have in-rm'd us; Why ſhould it not be looked on as a valuable Undertaking likewiſe, to quire after the *Celtick Hercules?* For ſo I ink we ought to call him, who was Lord all *Germany* and *France*, and not only Subduer of many fierce and warlike Na-ns, but the Peace-maker and glorious Re-rer of 'em, and was the Third Man in the orld who had the Sirname of *Great* be-w'd upon him as an Addition of Ho-ur, after thoſe Two conſiderable Perſonages, *mpey the Great*, and *Conſtantine the Great*. at whereas *Lactantius* wittily laughs at *rcules* being placed as an *African* among Gods, ſo we may ſay that *Mars* himſelf s ſeated like another *Charles* among the roes. And hence indeed they were not re commonly believed to have a certain gular Majeſty of Speech, and which *Eu-des* calls Εἶδος ἄξιον Τυραννίδος, *A De-ment worthy of Dominion*; and eſpecially uncommon Stature and Size of Body, ich we find has been handed down to by the Conſent of all Writers; for ſince Things appeared great in him, it could not uppoſed ſo neceſſary an Ornament ſhould anting; but yet we need not ſuppoſe to be a Giant, as *Goliah* the *Philiſtine*, *Maximinus* the *Thracian*, but as the chief rincipal Man of heroick Stature among warlike *Franks*, ſuch a one as *Turnus* among the chief of the *Grecians*.

----- *Præſtanti Corpore Turnus*
Vertitur Arma tenens, & toto Vertice ſupra eſt.

Or rather ſuch a one as *Saul*, the King and Anointed of the Lord, was among the Children of *Iſrael*, *who was higher than any of the People from the Shoulders and upwards.* And this ſame *Charles* was term'd the Anointed, and by the learned Men of his Age, ſuch as *Alcuinus*, *&c.* liken'd to and called another *David*. Particularly *Eginhardus*, who was not only a Contemporary of his, but likewiſe a Domeſtick; and that he might add Immortality to the deceaſed Emperor, ſays, That he was of a large robuſt Body, tall in Stature, yet that was ſo juſt as not to exceed Proportion, his Height being Seven Times the Length of his own Foot in Meaſure, which is indeed the very mean or utmoſt Limits of the Growth of a humane Body according to *Varro*: But becauſe his Stature is proportioned by the Meaſure of his own Feet, we cannot tell how to reduce this to the Standard of that of the *Greeks* or *Romans*. However this we may lay down, that the exact Stature among thoſe People that was allow'd for Beauty of Body, or the Standard of their Soldiery, was uſually held to be Five Foot Seven Inches as the loweſt. What muſt we ſay then of thoſe Nations, the *Goths*, the *Franks*, and *Burgundians*, that are able to produce Perſons that are Seven Foot high? What then may we not believe of ſuch Men, and what not of their King? For which Reaſon he is ſirnamed *the Great*, that this alſo may appear wonderful to ſuch a Progeny as ours, wherein

Terra malos Homines nunc educat atque Puſillos.

'The World produces nothing now but 'diſeaſed Men and Dwarfs.

But to the Buſineſs in Hand, the Emperor *Charles* had a Golden Rod or Staff which was the exact Meaſure of his Height, as a certain Monk of thoſe Times relates from one *Adalbert*, who lived betwixt the Time of the Wars of that Prince with the *Huns*, *Saxons*, and *Sclavonians*. Among other Things, he tells us of the Pride and Ambition of a certain *German* Biſhop, who would on Holydays carry before him this Golden Rod of that incomparable Prince, who had commanded it to be made according to his Stature, or the Standard of his Height. And this was what this wicked Man prefer'd to his Epiſcopal Croſier.

It is worth remarking, that the Princes or crowned Heads of thoſe Times did not carry ſhort, and, as I may call them, comical or mimick Scepters in their Hands, but rather long Spears, than Staffs, Batoons, and the like; ſuch as *Quirinus* is ſaid to have wielded, and ſuch as were ſeen in the Hands of the *Cæſars*, eſpecially *Otho* and the *Antoninus's*. And laſtly, ſuch as were expreſs'd in their Coins, from the various Figures of their Gods and Goddeſſes, as Enſigns of their Divinity; and which the Ruler of *Olympus Jupiter* himſelf, the Protector of all, us'd to ſhow as the Avenger of Wrongs. Thus *Charles* uſed to have carry'd before him on ſolemn Occaſions this Golden Rod, which therefore that Biſhop made uſe of as his Paſtoral Staff, and in the Abſence of the King ambitiouſly aſpired to himſelf. This choice Relict was committed ſafe after the Emperor's Death to a Caſtle, in order to be ſhown upon Occaſions to future Ages; and was what the ſucceeding Emperors made uſe of when they commanded their Armies in Perſon, and which was ſtruck upon their Coin.

The Magnitude of this Rod or Spear was ſtruck upon a Piece of Silver the Thickneſs of a Man's Finger, having the Letters neatly engraved with the Character of that Age, well known to the Learned.

KARLVS IMPR. JVSSIT CVBITV IST[VM] FACERE JVXTA MENSVRAM SVA[M]

The Emperor Charles *ordered that Cubit to be made according to his Height or Stature.*

But what ſhall I aſſign this Cubit to be? for it is very wide from that Senſe in which *Plautus* uſes it, where he ſpeaks of long Letters of a Cubit in Length; but what has been ſaid of this in all Ages, denotes not ſo much the Kind or Nature of the Meaſure as the Inſtrument thereof. *Papias*, in his *Lexicon*, ſays, That a Cubit makes a Foot and a half, and a Geometrical Cubit Six of our Cubits which is Nine artificial Feet. But the Emperor *Charles* reckons Seven of his own Feet Length to be the Meaſure of his Stature, and yet will have this called a Cubit, which bears the Shape or ſame Form with what we call an Ell or Aulne at this Day in ſeveral Languages; which is a Rod or Meaſuring-Staff, which is more ſo from the Kind or Sort of Meaſure, which varies conſiderably according to the Difference of Place, ſo as to contain a greater or leſs Number of Inches.

It remains now that we fix the Meaſure of the *Caroline* Foot, which we may do upon ſome better Grounds than *Pythagoras* went when he was to aſcertain the Body of *Hercules* from the Length of his Foot; for we from a certain Meaſure of the Body, and a certain Number of Feet, may eaſily meaſure one, by dividing the Cubit into Seven equal Parts, each of which contains an *Engliſh* Foot, or Twelve Inches; which is ſufficient to detect the immodeſt and fabulous Account that paſſes under the Name of *Turpinus* Biſhop of *Rheimes*, who would make a *Cyclops* of him according to his Deſcription; for he ſays he was Eight of his own Feet long, and thoſe too to be reckoned at the utmoſt Account, when as the *Caroline* Foot was nothing ſo large or extraordinary, but anſwers to that generally in Uſe among the *Romans*, and afterwards received among the barbarous Nations, as the learned *Lucas Paetus*, a *Roman* Lawyer, teſtifies, and thereto agrees to a Hair with the *Auguſtan* Foot, which as *Leonardus a Portis* writes, was meaſured *Roman*, a *Specimen* or Pattern of which is publiſhed by *Glareanus* and *Welſerus*.

The Learned Willis's Exercitatio Medico Phyſica, *concerning the Motion of the Muſcles.*

THere being two chief Faculties belonging to the corporeal Soul, to wit, the Senſitive and Motive, we have diſtinguiſh'd the Powers of oth into the external, which are in the ner-ous Parts, and into the internal, which re ſeated and produce theſe Effects in the rain, as the Imagination, Memory, Appe-te, *&c.* The motive and ſenſitive Facul-es are, in Reſpect to the corporeal Soul, erformed according to the different Diſpo-tion and Tendency of the Animal Spirits. or there is not one of our Senſes but what a Paſſion, in which the Soul, or at leaſt me Part of it, being ſtruck by ſome ex-rnal Object, is obliged to look as it were wards, by the interior Undulation of the pirits; but on the other Hand, a Motion is Action wherein the Soul ſeems to exert r ſelf, either wholly or in Part, in order extend ſome Member by the Fluctuation the Spirits outwardly.

Whenever the Soul or Part of it thus ex-s it ſelf, in order to perform the Actions which ſhe was deſign'd, the Congeries of e Animal Spirits, which are diſpoſed every here in the motive Parts, ſtirs up ſometimes e, ſometimes more, which being thus ex-nded with ſome Violence, and as it were ploded, does inflate or tumifie the con-ned Bodies; and theſe being increaſed in ickneſs, and ſhorten'd in Length, attract e Members that are annex'd to them, and ve them from their natural Poſition.

In all Motions, Three Things muſt be con-ered, *viz.* Firſt, the Origine of the Action, the firſt Deſignation of the Motion, which lways either in the Brain or in the *Cere-um*. Secondly, its Inſtinct, or the Tranſ-ſion of the Motion after it is begun, to motive Parts, which is performed by ans of the Spirits that flow in the Nerves. irdly, the motive *Impetus*, or the Exertion of the Spirits implanted in the motive Parts into a Contraction, or elaſtick Power, or Motion.

From this Threefold Headſpring may be deduced many very different Sorts of Motions, *viz.* according to the various Effects that are produced in either of them.

Firſt, in Reſpect to the Origine and Principle of Motion, it is to be obſerved, that that Motion which proceeds from the Brain with the Conſent and by the Beginning of the Appetite, is called the voluntary or ſpontaneous Motion; but that which has its Origine in the *Cerebellum*, where the Law of Nature preſides, as the Pulſe, Reſpiration, and many others, is called involuntary, or purely natural. Either of theſe Two is either direct, *viz.* which owes its Beginning chiefly, *& per ſe*, to ſuch or ſuch a Principle; as when the Appetite out of its own and, as I may call it, inteſtine Deliberation, craves ſuch and ſuch a Thing, and procures reſpective Motions. In the ſame Manner, when, according to the ſolemn Cuſtom of Nature, the ordinary Actions of the natural and vital Functions are perform'd, then the Motion of either of them is reflected, to wit, ſuch as depending immediately on a previous Senſation as an evident Cauſe or Occaſion, is returned in an Inſtant. Thus that gentle Titillation in the Skin, which we call Itching, moves us to ſcratch it, and an exceſſive Fermentation in the *Præcordia* produces a quick Pulſe and Reſpiration.

Secondly, as to the Vehicle by Inſtinct, which, according to our Suppoſition, is abſolutely performed by Means of the Nerves, conſidering that the ſame is made either by one ſingle Nerve, or elſe by ſeveral, it is called either a ſingle or complicated Motion; and then as the Nerves are ſubſervient to this Motion, by contributing either leſs

or more, or ſooner or later, ſuch or ſuch a Member is ſaid to be moved principally, & *per ſe*, and the other by Conſent. Nay, even this Conſent with the adjacent Parts, or the more remote, may be tranſacted in divers Reſpects. Of the Cauſes and Manner of which various ſympathetick Motions various Reaſons may be aſſign'd.

Thirdly, there is beſides this a very remarkable Diſtinction of Motions, which is taken from the various Conſtitution of the moving Parts, *viz.* to ſuch Parts as are provided with nervous Fibres, and in which the moving Spirits do flow. Theſe are either the Muſcles which perform the weak Motions or membranous Bodies, the Motions of which terminate within themſelves, which upon that Account I have called Inteſtine Motions.

As to what concerns the local Motion, which is to be the only Subject of our preſent Inquiſition, tho' it be confeſs'd by all, that the Brain, the *Cerebellum*, and the Nerves, as well as the Muſcles, either one or each of them, contribute their Share towards this Action; and notwithſtanding alſo it is very obvious, that the firſt Principle or Beginnings of this Motion is aſſign'd to the Brain or the *Cerebellum*, and that its Inſtinct is abſolutely convey'd thro' the Nerves. Notwithſtanding all this, it ſeems a Thing involv'd in no ſmall Difficulty to explain how it is poſſible that the Muſcles ſhould be able to perform this Work or Action ſo that it can be conceived or accounted for by the Rules of Mechaniſm.

That this local Motion is performed and depends on the Contraction of the Muſcle, is not only what has been eſtabliſhed by common Conſent of all the Naturaliſts, but is confirm'd alſo by Experiments or Autopſy. But the Authors are not only very dubious, but alſo much at Variance, concerning the Manner of this Contraction, as well as its efficient Cauſe.

Some think they have ſufficiently explained the Point in Queſtion, by ſaying, that the Soul by its Preſence does extend the Muſcle, and contract its Fibres here and there like a Net that is expanded. But by this Suppoſition, they attribute to the ſenſitive Soul a ſupernatural Virtue, or rather a Divine Power, *viz.* as if the Soul by its Breath only was capable of turning or forcing hea and bulky Bodies wherever ſhe pleaſed; a if ſo, I would ask upon what Account it that the motive Organs are framed with ſuc vaſt Variety, and as it were miraculou Contrivance, were it not that they were in tended to perform their Actions and Fun ctions after the Manner of well-contriv Engines; as appears by the internal Str cture and Function of their Parts. In m Opinion, it is not very difficult to adapt th Function of the Muſcles, as well as of th whole Structure of our Body, to the Laws o Mechaniſm, and to explain them purſuan to the Rules thereof. But before I enter up on that Task, I judge it will not be beyon our preſent Purpoſe to ſay ſomething in ge neral, by Way of Introduction, of th Frame, Structure, and Uſe of a Muſcle i ſelf.

Moſt of the ancient Anatomiſts hav unanimouſly diſtinguiſh'd or divided a Mu cle into three Parts, *viz.* the Head, the Be ly, and the Tail. The Head they called tha Part or Extremity of the Muſcle which wa annex'd to the Part to which this Contractio is made, and the Tail that Portion or Ex tremity of the Muſcle which was inſerte into the Part to be moved; and by the Bell they underſtood that intermediate or mi dle Part which contains the fleſhy Part, an is more tumid than the reſt. Now the ſuppoſed, that when the Muſcle was to pe form its Function of Motion, it ſwell'd a bout the Head and Belly, and that bein thus ſhorten'd in its Length, conſequentl attracted that Part which was annex'd to it But in what Manner, or what it was tha made the Belly of the Muſcle thus riſe int a Tumefaction, none among them ha hitherto explained in any intelligible Ma ner.

Furthermore, though the Myology, o Doctrine of the Muſcles, has been treated b by all the beſt Anatomiſts of all Ages, a far as to give, as they believed, an exact Ac count of all the Muſcles of the whole Bod and of their ſeveral Functions, and have ta ken Abundance of Pains to repreſent the to us under almoſt monſtrous Names. A ter all, the true internal Structure of a Mu cle, which had lain concealed hitherto, h been but of late diſcovered by the moſt in genio

rnious *Steno*. This great Man diſcovered e oppoſite Tendons in each Muſcle, into hich the Fibres terminate, and that in ſuch Manner, that the ſame Fibres which, when oſely conjoined with one another, form the endon, when at greater Diſtance, or in a oſer Connexion, frame the fleſhy Part of , ſo that the Fibres which are placed one pon another make the Depth or Thickneſs f the Muſcle, as thoſe that are placed at e Sides of one another conſtitute its Breadth. The firſt Fibres he calls *Ordines*, and the econd *Verſus*. After having thus diſcovered e Parts and Compoſition of a Muſcle, he dapts its Figure to the Rule of Mathema-cks, and according to thoſe Rules explains s Motions; for having obſerved that in very ſimple rectilineal Muſcle, all the car-ous Fibres run parallel to one another, and r the moſt Part equal, from one Tendon bliquely to the other, and that the Tendons emſelves are placed in the oppoſite Extre-ities or Angles of the fleſhy Part. He om thence drew the Deſcription he has ven us, and the Figure of ſuch a Muſcle elineated upon a Plan is very exactly repre-nted by the Inſtrument the Picture Draw-s make uſe of when they are to make ſeve-l Draughts of one and the ſame Thing at nce; for when they are fix'd to the oppo-te Angles of the Style, they repreſent the nſertions of the Tendons, and the *Paralle-grammum* it ſelf the carneous Part of the uſcle; for when the oppoſite Angles are awn at their greateſt Diſtance from each her, and render'd more acute, ſo that the *atera* or Sides approach nearer to one ano-er, and make the *Area* narrower: This preſents a Muſcle that is not contracted; t when the ſame Angles are brought nearer each other, and render'd more obtuſe, ſo at the *Latera* or Sides move at a greater iſtance, and conſequently, make the *Area* the Muſcle ſhorter, but at the ſame Time oader, they ſeem to repreſent a contracted uſcle. And all this while, in either of the uations of the beforelaid *Parallelogram-m*, there is no Alteration or Change in e Quantity or Longitude of the *Latera*; t the Variation is only in their different ſitions, and the Extent or Amplitudes of ir Angles, which, whether it be the ſame Thing in a Muſcle, will be ſhown here-after.

However, we may in the mean Time make this Obſervation out of the Suppoſitions of *Steno*, that a Muſcle is either ſimple, *viz.* ſuch as conſiſts of one Belly and two Tendons, of which there are many in the Arm and Leg, thoſe that move the Fingers and Toes, as well as in ſeveral other Parts of the Body; or elſe a compounded Muſcle, which has more Bellies, to each of which are annex'd two oppoſite Tendons, yet in ſuch a Manner, that ſeeing the Tendons themſelves are compounded, that is two of them are conjoined together, one of theſe compounded Tendons enters within the intermediate fleſhy Part, and the other embraces the ſame carnous Part on both Sides.

This is very evident in the *Maſſeter* and *Deltoides* Muſcle, and in all others; in all which, as well as in a ſimple Muſcle, whilſt the carnous Fibres, which are only endued with the moving Power or Virtue, are contracted, the oppoſite Angles are made wider near the Inſertions of the Tendons, and conſequently their Bellies becoming ſhorter and thicker, ſwell bigger.

In a ſimple Muſcle, where either one Tendon only, or both together, or elſe one or other by Turns, is to make the Contraction, and near which alſo the Part that is to be attracted is either thin or broad, either nearer or at ſome Diſtance, as alſo in Regard to ſeveral other Reſpects, the fleſhy Belly is reduced into a various Conformation; for tho' its moſt regular Figure is a *Rhomboides*, the ſame is nevertheleſs ſometimes triangular, ſometimes trapezial, pyramidal, ſpiral, and ſemicircular, or of ſome other irregular Figure.

But in all thoſe Muſcles, the carnous Fibres being placed at the Sides of one another, when they are all contracted at once, they ſwell in Bulk, and are drawn together, or corrugated from both Ends towards the Middle, though the ſame does not happen in all the Muſcles after the ſame Manner, and in the ſame Dimenſions.

For in caſe both the Tendons are to be attracted at once, the Contraction is for the moſt Part equal from both the carnous Extremities; but if only one of them is to be at-

attracted at the ſame Time, the Contraction is leſs from that which remains immoveable, and ſometimes went to none at all, *viz.* where the Fleſh immediately adheres to the Bone, without any remarkable Tendon. But there is a much greater Variety to be obſerved in the compounded Muſcles; for without inſiſting upon the various Figures, to enumerate which would be an endleſs Piece of Work, according to the ſeveral Degrees of their Compoſition, as they have either more or fewer Bellies diſpoſed into different Series, and thoſe with Fibres either of the ſame or of different Ranks or Orders, diſpers'd and extended into different Parts, they are diſtinguiſh'd from one another.

A thin Muſcle, ſuch as may be called a leſs compounded Muſcle, if it be provided perhaps with two or three Bellies diſpoſed in the ſame Plan, or upon the ſame Level, as the Series of the carnous Fibres looking different Ways, ſome of the exterior Tendons which embrace one Extremity of the Muſcle, and ſome other intermediate ones, which are inſerted near the other Extremity, ſo that each carnous Fibre of either of the Bellies lies parallel betwixt the ſame Tendon, at the Extremity, and the other intermediate Tendon.

But a thicker Muſcle, and ſuch as may be called more compounded, to enable it to perform ſwift, ſtrong, and continual Motions, is provided, with ſeveral Bellies placed in different Plans or Area's, and with ſuch Series of carnous Fibres, which are very ſhort, as look many different Ways. The Compages of theſe Muſcles, tho' it be ſo intricate that it is almoſt impoſſible to diſtinguiſh and enumerate all their Bellies, much leſs to give you an Account of what Reference and Diſpoſition they have to each other, their mutual Dependencies, or various Manner of Connexions, they may nevertheleſs be in ſome Meaſure reduced to this Rule, which ſeems to be almoſt common to them all, *viz.*

In the large compounded Muſcles, ſuch as thoſe of the Arms and Legs, which impart to theſe Members their extraordinary Strength and elaſtick Virtue, it is obſervable that there are two vaſt exterior Tendons, which almoſt cover the whole Surface of the Muſcle, and being ſeparated into many Fiſ-

ſures, are extended within an Inches Brea of the other Extremity of the Muſcle ne On the contrary, near this other Extremi another Tendon enters into the intermedi Fleſh, and ſoon after is divided into ma *Lamina*, which are diſperſed thro' the whol interior Belly of the Muſcle. And as the interior *Lamina*, meeting with the exteri and extended almoſt to the oppoſite Ext mity, look very different Ways, and th Surfaces are turn'd on all Sides; ſome theſe meet always with others that come t oppoſite Way, and are conjoined by the i tervention of the carnous Fibres. Such Muſcle as this, whoſe ſeveral Bellies bei placed on ſeveral Plans look very differe Ways, can never be divided or ſeparat without a Deſcription of ſome of the Seri of the carnous Fibres in the Middle.

The Bellies of theſe more compounde Muſcles, tho' many in Number, are neve theleſs very thin; for their carnous Fibre which are very ſhort, making always equa but at the ſame Time oblique Angles wit the tendinous *Laminæ*, conſequently produc a very ſtrong Attraction; for theſe num rous *Series's* of the carnous Fibres ſeem t repreſent as many Leavers intended for th moving of ſome weighty Body all at once; or rather, conſidering that each of the tw great Tendons is ſoon divided into man *Lamina*, it acts much after the ſame Manne as if a ſtrong Rope, which is tied or faſten to ſome weighty Body that is to be drawn, were divided into a great Number of ſmal Cords, to be pull'd or drawn by many a once. For whilſt each *Series* of the carnou Fibres is corrugated at the ſame Time, a the oppoſite Angles of the tendinous *Lam næ* are widen'd or brought at a greater Di ſtance at once, and conſequently the whol Belly of the Muſcle being ſwell'd, the ſtrongly attract either both Ends, or elſe th which is moveable.

All the Muſcles, whether ſimple or com pounded, are covered on all Sides with membranous Integument: Beſides which certain tranſverſe Fibrilles are interwove with the direct moving carneous Fibr which inveſt and conjoin them together nay, as it ſeems very probable, alſo commu nicate to all the carneous Fibres that Influ they have to perform their Functions of M

on in conveying to the Tendons that great quantity of Spirits which is communicated them by the Nerves. The Artery and ein, which are inſerted in the Middle of ery Muſcle, ſend forth their Branches on l Sides, which interſect the Motive Fibres bliquely, and among theſe the leſſer Branches Twigs, which are diſperſed thro' the carous Interſtices, irrigate them by the conual Afflux and Influx of the Blood.

But the Nerve which enters into each of e Bellies of any of the Muſcles, only emits ſmall Twigs into the adjacent Parts, as if were intended only to ſhow its Commiſn or Power of Action, whilſt it leaves e Execution of this Function to the infeor carnous Fibres, and the membranous Fiils. For if you take a ſimple regular uſcle out of any Animal, and place it ſo at the Tendon on either Side may be conicuous, and the carnous Fibres intercepted twixt them with oblique equal Angles, ing laid to a horizontal Plan, the fleſhy rt will repreſent exactly a *Parallelopipedum*, *omboides*; but if after this you change the uation of the Muſcle, ſo as to lay the ndon of the Muſcles above and below, u muſt diſſect the Tendon lengthways, d tearing the Parts aſunder, as well as the hole Muſcle, divide it into two Portions. ou will there behold in a moſt ſurprizing nner all the carnous Fibres diſpoſed in e Series parallel to one another, and of ſame Length, proceed from one Tendon the other, and on both Sides to make alys oblique and equal Angles.

And tho' it is not poſſible to diſſect and monſtrate the compounded Muſcles, the ferent Bellies of which are placed upon ferent Plans, after the ſame Manner with former, yet, if you will take the Pains diſſect them with Accuracy, either after y are boiled, or whilſt they are yet raw, will ſoon appear, that to each of the carus Parallelograms, two Tendons are ada- or annex'd.

As to the Action of a Muſcle, it is appat from live Diſſections, in which it is onconſpicuous, that it is performed by Ation, but not in the ſame Manner as it been believed and deſcribed by the Ants, to wit, ſo as that the Fibres being tracted from its Extremity towards its Principle or Beginning, one End of the Muſcle was to be drawn towards the other; whereas the carnous Fibres only and their Extremities were ſeen to be contracted towards the Middle, whilſt the Tendons remain without any Alteration or Change, as well in Reſpect to their Length as Thickneſs, as it has been long ago very well obſerved likewiſe by the learned *Steno*.

This is very conſpicuous in the Diaphragm, and likewiſe in the Muſcles dedicated to Reſpiration, which are always in a conſtant Motion. For here, as often as the Muſcle is contracted, you will plainly ſee all the carnous Fibres drawn at one and the ſame Time at both their Extremities, and to approach nearer to one another, no otherwiſe than if they were to go over one another on both Sides, and conſequently become ſhorter and thicker; but ſo ſoon as they are freed from this Conſtriction, they return to their former Length and Thickneſs.

When you ſee Things done in ſuch a Manner, 'tis natural to believe that ſomething, namely, the Spirit or the ſubtle Matter, flows out of the Tendons into the carnous Parts, which entering there on both Sides, bloats or tumefies them, and thruſts them cloſe to one another, and ſo conſequently each of theſe Fibres muſt become ſhorter and thicker: But when this ſame Matter afterwards flows backwards out of the fleſhy Parts into the Tendons, theſe Fibres being empty again, and freed from their former Corrugation, being now relaxed, they return or are reſtored to their former Length, and ſo again by Turns. *&c.* But whether the Thing happens actually thus or not, ſhall be examined hereafter.

However, to continue our Enquiry into the other *Phænomena* of the muſcular Motion, if after you have taken off the Membrane of the Muſcle, you ſeparate ſome of the carnous Fibres, by Diſſecting the Fibrils by which they are conjoined to others, ſo as to clear them from each other, you will find them in all their Motion thus ſimple and free, as well as others that are ſtill conjoin'd, to corrugate, as before. I have made this further Obſervation, that ſome of theſe Fibres that were thus cleared and free when cut off alone, and ſeparated from the Tendon, did nevertheleſs contract themſelves at the

the other Extremity as well as the other Fibres, according to the Motion of the Muſcles, that Extremity which was cut off remaining flaccid in the mean while.

After this, I ſeparated or divided a Portion of a thinner Muſcle, to wit, in its carnous Part, with a Pair of Sciſſars, and three or four tranſverſe Inciſions of an Inches Breadth; which done, the ſeveral Portions that were cut off at each Extremity ſhowed ſome ſlight and diſorderly Corrugations, which continued only for a ſhort Time; but afterwards became immoveable.

The other Portions of the diſſected Muſcle, which were ſtill coherent to the Tendons, diſcovered a much ſtronger and longer Contraction, but ſuch as was very irregular, and like a concuſſive Motion, attended with ſome Contortion of the Fibres. 'Tis certain that in theſe Fibres, after they were thus cut aſunder, there remained ſome ſlight Footſteps of a Contraction, being partly owing to the Inſtinct communicated to them by the membranous Fibrils, with which they were as yet coherent where the Fleſh remained entire; partly, becauſe the animal Spirits which are implanted into the carnous Fibres being ſeparated from the reſt, and deprived of their conſtant Supply, did at this Time ſhow their laſt Endeavours towards a contractive Motion, as they uſed to do before. 'Tis from the ſame Reaſon that ſometimes we ſee the Heart after it is taken out, as well as in other Muſcles after the Nerves and Blood Veſſels are cut away, this Contraction and Relaxation to continue ſome Time.

But the other Fibres, which were only diſſected, would for ſome Time continue their Contraction and Relaxation, by Reaſon of the Afflux and Reflux of the Spirits from the Tendons.

I ſeparated ſeveral particular Fibres in the Diaphragm from ſome other Fibres that were interwoven with them, in order to make an Experiment what Effects the Ligature made in divers Places of them would produce. Some of theſe, where the Ligature was made in the Middle, contracted themſelves in the ſame Manner as if they had been entire Fibres, only that there appeared ſomewhat of an Intromiſcency about the Ligature. But in others, where I made the Ligatures ſometimes at one, ſometim at the other Extremity where they were c herent with the Tendons, I might perce their Motion chiefly and almoſt ſolely the Extremity; whereas where the Ligatur were made at the ſame Time at both t Extremities, the Contraction abſolute ceaſed.

The Contraction and Relaxation is n only obſervable in the Heart, but alſo in t *Septum*, and the other Muſcles appointed f Reſpiration; and it ſeems very probab that in all thoſe that act according to the I ſtinct of Nature by Turns, and for the m Part with an equal Motion, tho' the Inte vals of theſe Motions are not alike in all them, it happens after the ſame Manne Nay, even the Muſcles that are ſubſervie to the voluntary Functions, often ma ſpontaneous Contractions, unleſs they a check'd by their Antagoniſts: As it is ev dent from thence, that a Spaſm of one Mu cle will enſue upon the *Paralyſis* of an ther.

The Contraction and Relaxation are mo frequent in the Heart than in the Mu cles deſign'd for Reſpiration; and ſo lik wiſe more frequent perhaps in theſe than ſome other Muſcles. This Motion by Tur is very evident in dying Perſons, by the i numerable tremulous Motions of the *P niculus Carnoſus.*

As to what relates to the Humours whe with all the Fibres of the Muſcles, nam ly, carnous, tendinous, membranous, a their Interſtices, are irrigated, repleniſh and inflated; of theſe, I ſay, there muſt aſſign'd Two at leaſt, *viz.* the Blood a nervous Juice, if not more.

'Tis manifeſt, that the Blood flows th all the carnous as well as membranous bres, which are interwoven with the f mer; for if you make an Injection of Sp of Wine, coloured with Ink, into the Ar that belongs to each Muſcle, and take C to make a Ligature upon the Vein, you w ſee the Surfaces of all the carnous Fibres, well as of the tranſverſe Fibrilles, tin with a black Colour, whilſt the Tend ſcarce ſhow any Alteration in their Colo So that it is manifeſt from thence, that Blood irrigates all the exterior Parts of fleſhy Subſtance; but whether the Blood

netrates quite through the carnous Fibres, or only inſtils into them a ſubtil Juice or Liquor, which is ſeparated from the Blood, I cannot affirm as yet by any certain Experiment, tho' the nervous Juice ſeems to be very probable.

As all theſe Fibres, to wit, the carnous, tendinous, and membranous, are without Intermiſſion, and in great Plenty, actuated by the Spirits which are either innate or adventitious, ſo they are doubtleſs alſo conſtantly ſupplied with the nervous Juice, which ſerves for a Vehicle to thoſe Spirits. But in what Manner, or how much the ſaid Humours contribute towards the Actions of the Animal Functions is not diſcovered as yet; and becauſe the animal Spirits cannot ſubſiſt without the nervous Juice, and depend in a great Meaſure upon its Conſtitution, we may very well conclude that this Juice is in ſome Meaſure ſubſervient to the actuating of the moving Power; and that for the ſame Reaſon the continual Afflux of the Blood is neceſſary, is fully confirm'd by a certain Experiment mentioned by the ingenious *Steno*, and ſince often tried by others. He obſerved in a living Dog, that when a Ligature was made on the deſcending Trunk of the *Aorta*, without any previous Section, that the voluntary Motion ceaſed as often as he drew the Thread cloſe together, but would return as often as he looſed it.

Theſe are the chief *Phænomena* obſerved in the Diſſections of Animals, either living or dead, or at leaſt ſuch as were upon the Point of Death, concerning the Structure and Action of a Muſcle; but if after all we compare them with one another, how difficult a Task it will prove to inveſtigate a true Ætiology of the moving Function of the Animal, is among other Things evident from thence, that the moſt ingenious *Steno*, after he had publiſhed his Principles of Myology, ſuch as they were invented by himſelf, nevertheleſs did not think fit to make them the Foundation of a certain Hypotheſis; being after all dubious whether the Examination of a Muſcle by a *Rectangulum* could be adapted to or take Place in all Reſpects according to the natural Functions; and ſince upon that Account many of the Authors have deduced the Manner of the muſcular Contraction from the Repletion of the Fibres, ſome from their Inanition or Emptineſs, and ſome others of both, he ingenuouſly confeſſes that he was yet ignorant of the true Cauſe of it.

I will not be ſo preſumptuous as to aſſert, that in ſo abſtruſe a Point as this I have been able to go beyond what others have diſcovered before me; nevertheleſs, as in mechanical Operations, where we have an Opportunity of obſerving the Motions of an Engine, and take it into Pieces, in order to make a more exact Scrutiny into the peculiar Structure and Contrivance of each particular Part, we uſed to make or give a certain Judgment of the Cauſes and Manner, if not of all, at leaſt of the cheifeſt of the *Phænomena* belonging to it, in the ſame Manner; ſince it is in our Power to take Notice and view with our Eyes the Structure and Parts of a Muſcle, the Conformation of the moving Fibres, their Functions, and various Alterations in their Motions; why then ſhould we deſpair of inveſtigating or finding out the Reaſons and Cauſes, either ſuch as are real, or at leaſt approaching next to thoſe that are real, of the moving Functions, which if they may not prove ſatisfactory to all, they may at leaſt prove an Inducement to others to improve this *Hypotheſis*.

And here I am obliged firſt of all to repeat once more what I have intimated before, *viz.* that the Vertue or Power by which the Muſcle is moved proceeds primarily from the Brain; that it is convey'd by the Nerves, and is accompliſh'd by the carnous Fibres in their Contraction and Abbreviation. The laſt is proved by daily Experience. Beſides, that all the moving Power or Spring depends alſo on the foregoing Cauſes, and is transferr'd thither by a long Tract, is evident from hence, that whenever the Influx of the Spirits is ſtop'd near their Origine, or intercepted in its Paſſage thither, the Actions of the deſigned Motions are alſo impaired or ſuſpended. 'Tis therefore obſervable, that the *Impetus Motivus* is much ſtronger in the End of the Muſcles than in its Beginning or Middle; for conſidering that the Brain and theſe Nerves that are annex'd to it conſiſt of a very tender and brittle Subſtance, they are not in a Capacity to make any

ſtrong Attraction or Convulſion; but when the Muſcle exerts its Strength in contracting, it ſeems to ſupply the Place of a Leaver or a Pulley.

Conſidering therefore that local Motion is a compounded Action, which depending on many Organs, is to be performed in various Places; and that its Power or Spring is much ſtronger in its End than in its Beginning or Middle, it is our Buſineſs now to enquire by what Rules of Mechaniſm this *Impetus Motivus* may be augmented or multiplied in its Progreſs; and next to this, how much every Organ contributes to this Motion.

Concerning the Firſt, it is to be obſerved, that in all the ſeveral Inſtruments or Engines that have been invented, either to facilitate or to augment their moving Power, all theſe, or at leaſt the chiefeſt of them, may be brought under theſe Two Heads; *viz.* Firſt, either this moving Power or Impreſſion is continued without the Addition or Acceſſion of any new Force from one End to the other, or from the firſt moving Part to that which is to be moved; and this Power may be in its Way augmented conſiderably, according as the Centers of Gravity are either ſet at a greater Diſtance, or elſe multiplied; for at the greater Diſtance the Motion begins from the firſt Center of Gravity, the ſtronger it will be in its Progreſs; as it is plainly obſervable in the Leaver, or ſuch other Things as are of the ſame Nature.

Beſides this, in caſe beyond the firſt Center of Gravity there are others diſpoſed alſo ſucceſſively before the Termination of the Motion, as in the *Peritrochium*, then the ſame moving Force is much augmented; but to effect this, it is requiſite that the Inſtruments of Motion ſhould in every Part of them be ſtrong and tough; for elſe, upon the Increaſe of the *Impetus Motivus*, they will break, and the Motion ceaſe before it can perform the intended Action.

Secondly, there is alſo a certain Way of multiplying for ever the *Impetus Motivus*, and that to a very great Diſtance, which is effected by the Addition of new Strength and freſh Supplies; *viz.* when the Elaſtick Particles, or ſuch as move with an *Impetus*, being contained or ſhut up in ſome ſecret Receſſes or Cells, do upon certain Occaſions, and by the leaſt Contraction, break out into an uncontroul'd Motion, which they perform without the leaſt Delay.

For the ſame Mover, as we ſee the Air which has been incloſed in a narrow Compaſs, after it breaks forth, drives before it at a great Diſtance a Leaden Bullet, or the like, with great Impetuoſity. 'Tis very well known what ſtupendous Effects and Motions Gun-Powder, when once it has taken Fire, produces towards the Termination of its Motion; whereas at firſt, when it takes Fire by Means of a Match, its Force is but weak, and may be extinguiſh'd with the Squeezing it down only with ones Finger.

There are ſeveral other Sorts of explosive Bodies, which, if detained in convenient Cells or Receſſes, as ſoon as they are put in Motion, produce almoſt incredible Effects. So that we muſt at this Time enter into an Examination, by which of theſe two Motions it comes to paſs that the moving Power in a Muſcle ſo far exceeds the *Impetus* which is tranſmitted thither from the Brain, by Means of the Nerves; or whether the muſcular Motion be a contractive Action, or whether an elaſtick or rather explosive Power.

And now it is beyond all Diſpute, that the Muſcles do attract, that is, that being render'd ſhorter, they attract or draw the Tendon together with the Part that is annex'd to it; and that furthermore, as far as it is requiſite, theſe Functions of Attraction are performed by them, ſometimes ſtronger, and ſometimes more remiſs; that the Centers of Gravity are ſometimes nearer to and ſometimes more remote from the Principle of Motion. Hence it is, that the Muſcles which extend or bend the *Femur*, as the *Pſoæ* or the *Glutæi*, have their moving carnous Fibres fix'd deeper within the Trunk of the Body. But thoſe that turn about the *Femur* have their Poſition near the *Foramen* of the *Tibia*, or near its Tubercle, or in ſome Place or other thereabouts. 'Tis further obſervable, that in all the other Muſcles, their Belly has its Situation either nearer or remoter from the Joint, in Proportion as its Motion is to be either ſtronger or weaker. But this I don't aſſert as to the other moving Parts,

Parts, *viz.* the Brain and the Nerves, which cooperate together with the Muſcle in the Action of Motion.

For tho' this motive or moving Power is by a long Tract carried thro' all theſe Organs, yet it ſeems impoſſible that ſo ſtrong a Contraction as that which is made by a Muſcle ſhould have its Beginning in ſo tender and immoveable a Part as the Brain is, and ſhould be continued through ſuch tender and ſmall Bodies as the Nerves are; ſo that we muſt of Neceſſity ſuppoſe certain moving Particles to lie concealed within the Muſcle; which upon Occaſion, according to the Inſtinct tranſmitted thither from the Brain, are ſet in Motion by Way of Exploſion; but what theſe Particles are, and how they act upon the Muſcles, ſeems to be a hard Task to explain.

That there are certain Elaſtick Particles, and ſuch as are able to put themſelves in Motion, and are every where inclos'd within the Fibres, may be concluded from their Effects; becauſe in the Anatomy of living Creatures we oftentimes obſerve a Motion in a Muſcle after its Separation, nay even in its Fibres when divided from one another. The Heart of ſome Animals has been ſeen to continue its Pulſation for a long Time, and the contractive Motions have laſted ſometimes after a Muſcle has been quite cut out. In Beaſts, when they are ſlaughter'd, or juſt at the Point of Death, tho' the Heart and Brain has been taken out, the *Panniculus carnoſus* will for ſome Time after perform the Actions of Contraction and Relaxation by Turns. From whence it is very evident, that there are within the Muſcle it ſelf certain very agile moving Particles, which tho' they, in caſe the Animal Oeconomy be much diſturb'd, or quite deſtroy'd, do begin or enter into a voluntary Motion; yet, in a State of Tranquility, they don't perform any Actions unleſs ſuch as have their Originations in the Brain and the *Cerebellum*, and are communicated to them through the Nerves.

It is demonſtrable by the Diſſections of living Creatures, that when the Muſcle is contracted, 'tis the carnous Fibres only that enter upon the ſpontaneous Motion, which being tumefied and render'd unequal and ſhorter, dilates the Belly of the Muſcle; and that in the mean while the Tendons, which are immoveable as it were of themſelves, as not ſuffering any Alteration, either in their Length or Thickneſs, are moved only as far as they are pull'd or drawn by the carnous Fibres, and ſo attract the Part that is to be moved along with them. From whence it ſeems to be apparent, that the animal Spirits, or the elaſtick Particles, whatever they be, have their Agitation only, or at leaſt chiefly, within the carnous Fibres. And here ſome will perhaps be apt to imagine, that theſe Particles are either not extant at all, or elſe lie idle in the tendinous Fibres; for ſince it is obſervable that a Tendon does not ſuffer any Immutation in the Action of Motion, 'tis reaſonable to conjecture that it is here in Lieu only of a Hook, by Means whereof the carnous Fibres being contracted, they draw the Member or Part that is to be moved, and at ſome Diſtance from them, towards them.

But notwithſtanding this, it is evident by many Signs and Inſtances, that the animal Spirits, or elaſtick Particles, have their Reſidence more abundantly in the tendinous Fibres than the carnous ones; as is ſufficiently apparent by the Senſation of Feeling, which is much more acute and exquiſite in the Tendon than in the fleſhy Part; ſo that Irritation or Solution of Continuity which happens in that Part produces very troubleſome Senſations, that is, violent Pain, not only there, but alſo a Tumour in the adjacent fleſhy Parts, and ſometimes pernicious Convulſions. From whence we may rationally conclude, that the animal Spirits are lodg'd in great Plenty in the tendinous Fibres. But in what Manner they act here, and how they are ſubſervient to the motive Functions, is to be the Subject of my next Enquiry.

As often as I have had Occaſion to inſpect and conſider the Motion of a Muſcle in a living Creature, namely, what Manner all the carnous Fibres are contracted and relax'd by Turns, I could not conceive any Thing elſe from thence, but that in every Contraction the Spirits or ſome other elaſtick Particles do as it were make an Irruption from the two Tendons into the carnous Fibres, and that they tumefy and draw them together within themſelves; and that when the ſame Particles withdraw themſelves out

of the fleshy into the tendinous Part, then the Relaxation of the Muscle is performed.

After the Separation of a Muscle, I plainly discovered by the Help of a Microscope sometimes in one single carnous Fibre, sometimes in a whole Train of them, a Tumour beginning at each End of the fleshy Part, made as it seem'd by the Spirits entring from both Sides to the middle Part; and that furthermore, as I have intimated before, a simple Fibre, when tied about its Middle by a Ligature, did contract it self in the same Manner as if it were not tied, and still coherent with the rest; but when the Ligature was made at either of its Extremities, there always appeared a Flaccidity about that Part where the Ligature was.

But to take away all further Occasion of Dispute, in Relation to this Point, I made two Ligatures about the same *Fasciculus* of the carnous Fibres, which were at an equal Distance from the middle Part and their Extremities; which was no sooner done, but there happen'd at both Sides a Contraction, from the Extremities of the fleshy Part to the Places where the Ligatures were made, and a rising Intumescency, which did not go beyond them, the intermediate Part remaining in the mean while immoveable, and quite flaccid. From whence we may rationally conclude, that in all the Contractions of the Muscles, the animal Spirits or Particles do make an Irruption from the tendinous Fibres to the carnous, and so contrarywise; that in the Relaxation they withdraw from the fleshy into the tendinous Parts. But tho' this were sufficiently proved, and taken for granted, there are nevertheless many other Difficulties remaining concerning the muscular Motion. For first of all, it must be further enquired, how it comes to pass that the same animal Spirits which are lodg'd and remain so quiet without any Irritation or Tumefaction in the tendinous Fibres, should be able to bloat up, and reduce unto a shorter Compass the carnous Fibres?

To account for this Effect, it will not be sufficient only to bring upon the Stage the great Quantity of the Spirits which make their Irruption from the tendinous Fibres, but we must suppose besides these, some Particles also of a different Kind, which are implanted into the carnous Fibres, and these meeting with those others that make the Irruptions from the Tendons, there arises a Conflict, and from thence a mutual Rarefaction and Turgescency, and an Inflation or Tumefaction, as well as an Abbreviation or Shortening the Bodies which contain them, much after the same Manner as we see the Corpuscles of the Fire, when translated into a *Corrigia*, and propelling its implanted Particles, wherewith they are intangled in an Instant, bloat or tumefy and corrugate them; so the animal Spirits, while they are by themselves within the Tendons pass through them without causing any Motion there, just as the Effluvia's of Heat pass through Metals and dry Bodies; but after being transfer'd into the fleshy Parts, and intermix'd with some elastick Particles of a different Kind, they produce a Conflict and Expansion, and consequently a sudden Inflation and Corrugation of the Fibres which contain them; and that such like Particles very different from the natural Constriction of the Spirits, and of a heterogenious Nature, may be very easily and in great Plenty convey'd into the Muscles, has been shown in another Place.

For it is evident by Experience, that the Blood waters all the carnous Fibres everywhere, which, besides that it supplies them with Nourishment, does also actuate them in Reference to their Performances of the animal Functions; and why should we not draw a probable Conjecture thence, that it may also instil into their *Tubuli* a certain subtil Juice or Liquor, the Particles whereof being put into Agitation by the Spirits which flow into the carnous Parts, do not plenish the Fibres, and causing a Tumefaction thereby, the Irruption that is made from both Sides forces them into a narrower Compass. Neither is it the least to be doubted, but that the fleshy Belly of the Muscle tumefies when it is contracted, because it is plainly perceived both by the Eye-sight and Feeling, in the Dissections of living Creatures; for all the carnous Fibres do corrugate at once, are tumefied and become more rugged, and consequently the Muscles made not only shorter, but so thicker and broader.

To convince you of this Truth, I make a Ligature on some of the carnous Fibres

ere ſeparated from the reſt, and at the me Time left others that were next adja- nt to them without any Ligature; and I und a very notable Difference betwixt oſe firſt that appear flaccid, and theſe lat- which were tumefied.

But if any Body ſhould have the Curio- y to enquire of what Nature the animal irits are that are carried from the Brain to the Muſcles, Whether of a ſaline ſpi- uous Nature? as it is very probable they ; and next, Whether the others which immediately ſupplied to them from the ood are ſulphureous or nitrous? But theſe ings being beyond the Reach of our Sen- , I ſhall not pretend to determine. Yet, nſidering that in other natural Actions or nctions the active Particles of divers nds, which are very different from one other, are apt to go into a mutual Effer- ſcency to be ſtruck as againſt one ano- er, or may be rarefy'd and expanded ſome her Way; and conſidering further, that Inteſtine, and more eſpecially the elaſtick otions, ſuch as the Contractions of the uſcles, are or may be deduced from ſuch a onflict of the Particles, 'tis reaſonable to ſume that theſe Motions do actually de- nd on ſome ſuch like Cauſe.

In Relation therefore to the muſcular otion in General, I judge I may by a pro- ble Conjecture conclude, that the animal irits being from their Origine in the Head nvey'd through the Nerves to every Muſ- , and, as it ſeems very probable, received the membranous, are by them convey'd o the tendinous Fibres, and laid up ere as it were in great Plenty, in commo- ous Store-houſes; and theſe Spirits being ry quick and elaſtick, and apt to expand emſelves as far as they are able, do make Irruption into the carnous Fibres; but on after, having ſpent their firſt Fury or *petus*, they ſlacken and withdraw into Tendons, and ſo by Turns.

But whenever theſe Animal Spirits, at the inct of performing their Function of Mo- n, do make an Irruption from the tendi- us into the carnous Fibres; they meet there th ſome other active Particles of a different ture, carried thither by the Blood, from nence an Effervescency ariſing by the Con- t of theſe two Sorts of different Particles, and their Agitation, the carnous Fibres, which are lax and porous, are repleniſh'd and drawn into Corrugations; and from all theſe Corrugations on both Sides proceeds the Contraction of the Muſcle. So ſoon as the Contraction ceaſes, thoſe Spirits which are pure do for the moſt Part withdraw into the tendinous Fibres, leaving the reſt within the carnous Fibres, and what is loſt in the Effervescence of the laſt, is made good by a freſh Supply from the Blood, as that of the others is compenſated by the Nerves.

But by what Inſtinct the Contraction of a Muſcle does begin and end, ſhall be examined hereafter. That the animal Spirits which proceed from the tendinous Fibres may enter all the carnous Fibres equally, there are two Tendons in each ſimple Muſcle, which are conſtituted in ſuch a Manner at their oppoſite Angles, as that the Spirits which flow thither from a double ſtarting Place, as I may call it, do in an Inſtant fill up the whole Belly of the Muſcles; and after the Motion is performed, withdraw likewiſe with the utmoſt Celerity.

In caſe this Contraction is to be made indifferently towards the Middle of the fleſhy Part, the Tendons are for the moſt Part equal; but in caſe the Motion is to incline more towards one certain Motion of the carnous Part, then one of the Tendons, *viz.* that which furniſhes the greateſt Supply of Spirits, exceeds the other in Bulk; and as the Muſcle is proportionable in Strength, ſo it is in Size and Bigneſs; and then it is divided into ſeveral Lobes or Bellies, to each of which belong two Tendons, which was done to the End that the animal Spirits might every where, through the ſhorteſt Ducts, namely the Tendons, be convey'd and make their Irruptions into the carnous Fibres. For a compounded Muſcle is not provided with divers of the Series of the moving Fibres, for that Reaſon only, becauſe it ſhould be enabled to perform ſeveral and thoſe different Sorts of Motions at once; but alſo upon another Account, to do the ſame Motion with greater Strength and Vigour; for, as has been hinted before, a ſimple Muſcle being like a ſimple Leaver, a compounded Muſcle may be compared to ſeveral Leavers; all which are in Conjunction deſign'd to be ſubſervient to the Motion of one and the ſame Body.

It is further to be obſerved here, that in ſome Muſcles which are conſidered as ſimple and regular Muſcles, as all their carnous Fibres are equal, ſo the tendinous of one Extremity, taken all together, are equal alſo to all the others of the other Tendon taken all together; but if you take them ſingly, the ſhorter they are in one of the Tendons, the longer they are in the other; being ſo diſpoſed as that the uppermoſt tendinous Fibre on both Sides, and the lowermoſt, have, in Reſpect to their Lengths, a contrary Proportion to one another, and yet more equal; that is, that here the largeſt is placed upon the ſhorteſt, but there, on the contrary, the ſhorteſt upon the longeſt; which was done to this End, that as on one Side or the other of the Muſcle the Motion is required to be ſtronger, the Spirits might flow into thoſe Parts in greater Plenty from the longer tendinous Fibres, and ſo contrariwiſe.

And therefore it is, that in ſome Muſcles which are not ſo abſolutely neceſſary, where Part of the fleſhy Body being annex'd to the Bone, does either become immoveable, or ſerves only to fill up ſome Interſtices or Vacuities, the one Tendon is leſſer and ſhorter, and oftentimes degenerates into a Cartilage, or the Solidity of a Bone.

Furthermore, in Relation to the other ſtronger Muſcle, and ſuch as are intended for frequent Motions, it is obſervable, that their Tendons are not diſpoſed in ſuch a Manner as if they were the Supporters only or Handles of the carnous Fibres; for if ſo, they would have had their Situations only in the exterior Extremity; but the tendinous Fibres being expanded or diſperſed through all and every Part of the Muſcle, do embrace as it were both the Extremities of the carnous Fibres, the better to adapt them to furniſh a Supply of animal Spirits out of their Store-houſe. This appears the more plain in the compounded Muſcles, in which one compounded Tendon embraces the Extremity of the fleſhy Part; and the other enters into the middle Part of it, as has been ſhown before.

But that the animal Spirits alone, when they make their Irruptions out of the tendinous into the carnous Fibres, are inſufficient to produce the Corrugation in the Muſcle, but require the Aſſiſtance of an elaſtick Matter, which is ſupplied from Blood, may be aſſerted upon very good Reaſons. This ſeems to be more eſpecially evident from thence, that the ſelf ſame Spirits whilſt contained by themſelves within the Tendons, and that in great Plenty, do their Motions there produce nothing that is either like a Contraction or Tumefaction, and conſequently, conſidering that when they are carried, though in a much leſs Quantity, into the carnous Fibres, and occupy a much larger Space or Extent than before, they would not thus expand themſelves, much leſs produce ſuch a contracting Force, were it not for their being intermixed with the other Particles, which bring them into an Effervеſcency.

'Tis further obſervable, that when there happens a Solution of Continuity, or ſome other heavy Diſaſter to the Tendons, the Belly, or the carnous Part of the Muſcle is chiefly affected with a Tumour or a Spaſm, for the Spirits being irritated, not while they are by themſelves, but when they are ſtruck againſt the other heterogeneous Particles, they produce inordinate and tumultuous Motions.

If beſides this it be conſidered, that the carnous Fibres are irrigated by a continual Afflux of a ſanguineous Humour beyond all the other Parts, and that in a greater Quantity than what is required for their Nouriſhment, what other Uſe can be aſſign'd to this Humour than its being ſubſervient to the motive Function, eſpecially ſince it has been obſerved, that in macilent Bodies, which don't take up ſo much of the nutritious Juice, the Muſcles are overſtrained with Blood, and over ſtrong in their Motions.

Again, it is not yet diſcovered by what other Ways and Means the continual Loſs of the Spirits, by the conſtant and frequent Motions, and hard Labour, can be made good, unleſs we will allow of ſome ſuch conſtant and plentiful Supply furniſh'd from the ſanguineous Maſs, beſides that ſlender Quantity that is carried thither by the Nerves. Add to this, that whenever any Member happens to be deprived of the uſual Afflux of the Blood into that Part, it will ſoon turn Paralytick. And *Steno* has obſerved that

the deſcending Trunk of the *Aorta* be-
tied up by a Ligature in a Dog, his po-
ior Parts were ſoon deprived of all Man-
of Motion. And tho' I am not as yet
y ſatisfied whether this Effect ow'd its
ſe to the Blood being excluded from its
x into the ſpinal Marrow, or into the
ſcles themſelves, or perhaps to both; but
at be as it will, it is the ſame Thing;
much as the animal Spirits procreated
he Brain and *Cerebellum*, and diſpers'd
ugh the medullar and nervous Appen-
s, cannot execute their Power of local
ion, without the Concurrence of the
d.

aving thus far explained to you in what
ner a Muſcle, by making a Contraction
ll the carnous Fibres at once, executes
Function of Motion; the next Thing to
quired into is what that Inſtinct is, by
Means whereof all the Motions as well
lar as irregular are performed.

oncerning this Point in Queſtion, it is
ciently known that in General the *Im-*
or Inſtinct, as well of all the regular
ions as of ſome irregular, having their
Riſe in the Brain and the *Cerebellum*, are
thence carried to each of the Muſcles,
eans of the Nerves, as is very evident
its Effects and Conſequences, as has
ſhewn before. Nevertheleſs there are
ome Difficulties remaining, *viz.* how
e ſame Ducts freſh Supplies of the
l Spirits are convey'd to each Muſcle,
air the Loſs of the former, in the Exe-
n of their Functions, according to the
ium Animi; and at the ſame Time by
different Influx and Diverſification of
pirits that have their Influx there, the
s are able to execute both theſe Fun-
.

I may be permitted to give my Opinion
ed upon Conjectures, here it ſeems as
animal Spirits which, having their
n the Brain and *Cerebellum*, flow into
Muſcles by Means of the Nerves, to
the Loſs of the implanted Spirits,
there with much Eaſe and Quiet, and
received there by the membranous Fi-
dge themſelves in the Tendons; and
is be but in a ſlender Quantity at a
yet being carried thither without In-
ion Day and Night, it ariſes to ſuch a Portion or Quantity as is ſufficient to fill up the tendinous Store-houſes. The Reaſons why we ſuppoſe theſe Spirits, which are thus conſtantly carried to the Muſcles, to be convey'd to the Tendons, not by the carnous but by the membranous Fibres, is, becauſe in caſe they did enter there, firſt of all the elaſtick Juices would immediately enter into a Fermentation with 'em, and conſequently irritate the Muſcle into a perpetual Motion. And ſince in the Heart and the Muſcles of Reſpirations, the carnous Fibres are always in a continual Motion, they could never ſtand in Need of a freſh Supply of Spirits towards the Tendons.

As to what concerns the Inſtinct of exerciſing the Function, or ſtopping the muſcular Motion, communicated from the Head though the Nerves, it is to be conſidered before all other Things, that the moving animal Spirits, the Congeries of which conſtitute the *Hypoſtaſis* of the corporeal Soul, are endowed with theſe two Properties peculiar to their own Nature; to wit, that whilſt they are in their Vigour uncontrol'd, and that in a ſufficient Quantity, they are inclined to be in Action, or to expand themſelves; and that when their *Impetus* is over, and they are become leſs in Quantity, they retreat and remain in a State of Tranquility of their own Accord; but that after they have acquired new Vigour again, they will make their Sallies afreſh, and ſo by Turns. This is manifeſt from being aſleep or awake, from being employed in laborious Exerciſes or idle, and other ſuch like alternative Operations that are natural to all Sorts of Animals.

So that there is ſcarce any Thing more required to the *Impulſus* or Inſtinct of ſome Muſcles, I mean thoſe that are in a conſtant alternative Motion of Contraction and Relaxation, than a conſtant Supply of animal Spirits, which flow through the Nerves; which done, theſe Spirits being in ſufficient Quantity, and inclined to Motion, will of their own Accord make their Sallies into the moving Fibres, and after having ſpent their firſt Vigour, and Part of their Quantity, they withdraw; but being ſoon refreſh'd, are expanded again, and ſo on alternatively.

Their Actions, which conſiſt chiefly in the Pulſe and Reſpiration, do alſo vary according

cording to the different Degrees of Heat, or the Alterations of Paſſions; for as much as the Spirits which are carried by the Nerves thither, are ſent ſometimes in a greater Quantity, ſometimes with a more ſwift, and at other Times with a more remiſs Motion, from the *Cerebellum*. In all the other Muſcles which are ſubject to the Command of the Appetite, conſidering that the animal Spirits naturally affect the alternative Operations of Expanſion and Retraction, there is no more required than to give a ſignal either for the Execution or the Ceaſing of the commanded Function; both which is eaſily accompliſh'd by the Influx of the Spirits, by ordering the implanted Spirits, by their various Influxes through the Muſcles, into different Dependencies.

When the Muſcle is contracted, the implanted Spirits have their Bent from both Extremities towards the Middle; but when it is in a State of Relaxation, quite the contrary. When therefore the Spirits by their Influx give the Signal for the Contraction, thoſe that are within the Nerve being put in Motion, inflate or puff up that End which is inſerted into the Muſcle, where they lie cloſer together, and conſequently produce a Contraction and Abbreviation. Whence it is that the ſame Spirits which flow into and are to enter the Muſcle, are then check'd or rather recall'd towards the tumefied Nerve; ſo that immediately the whole Series of the implanted Spirits looking that Way, thoſe that are lodged within the Tendons, make their Sallies out of their proper Receptacles, and thus produce what is called a motive Contraction.

The Motion is check'd or ceaſes afterwards, ſo ſoon as the Spirits being recalled towards the Nerve do afreſh enter into the Muſcle, ſo that the implanted Spirits are again forced backwards into the Tendons. That it happens much after this Manner is not founded upon a bare *Hypotheſis*, but upon anatomical Obſervations; for I remember ſome Time ſince, when I diſſected a living Dog, and happen'd to look upon ſome of the Muſcles of the Neck that were ſeparated and laid aſide, I obſerved, that in the ſame Inſtant the carnous Fibres and the Nerves that were inſerted into the Muſcle were contracted, tumefied, and abbreviated.

The membranous Fibres which tranſverſ[ally] interſect and decuſſate the carnous Fibr[es] ſeem to contribute very much to the draw[ing] ing back the Spirits out of the carnous Fi[bres] bres into the Tendons. When the Muſcle [is] contracted, their moſt admirable Contexture may be diſcovered in a Muſcle provided with large Fibres, to wit, that of an Ox, after it is well boiled; for if you take a [view] View of ſuch a Muſcle, and gently open the carnous Fibres, ſo as to lay them aſunder in a whole Series, you will upon each of theſe *Tubuli* find certain capillary Fibrils very thick, extended over them, namely, ſo as not only to inveſt but alſo to conjoin the former: And are not only extended over every one of their Series's, ſo as to interſect them with oblique Angles; but alſo lying all parallel to one another, in a Situation quite contrary to that of the carnous Fibres they reach from one Tendon to another.

Whilſt therefore in the Contraction of a Muſcle the carnous Fibres ſwell, the Fibrils which embrace them are ſomewhat diſtended, to make them give Way; and after the as ſoon as this Intumeſcency is over, or begins to ceaſe, they return to their former Conſtriction and Compreſſion of the fleſhy Parts; which, when the Spirits are expelled on both Sides, they reduce to their natural and former Longitude; ſo that when the Muſcle is contracted, the Spirits which have their Influx through the Nerves do retire from the membranous Fibrils, which being thus relaxed and empty, may be the ſooner diſtended; but then the Muſcle is in a State of Relaxation, the Spirits enter afreſh into the Fibrils, fill them up, and ſhorten them, that they may the better cauſe a Conſtriction upon the fleſhy Parts. The inſtincts of the Motions to be performed by the Muſcles being thus tranſmitted by Means of the Nerves, either from the Brain by the Command or Conſent of the Appetite, or elſe from the *Cerebellum*, are for the moſt Part, according to the Laws of Nature, accompliſh'd without our Knowledge.

Beſides this it happens ſometimes, that the Muſcles are drawn contrary to the Appetite or Laws of Nature into inordinate, violent and convulſive Motions, and that by many different Ways and Means. We had Occaſion (ſays the Author) to treat of this

at large, when we ſhow'd that moſt of the various Sorts of convulſive Motions had their Riſe from thence, that the ſpaſmodick Matter was fix'd ſomewhere, either about the Beginning, Middle, or Extremities of the Nerves, or elſe being not fix'd, but at Liberty, running thro' the whole Extent or Ducts of the Nerves, did conſequently carry the ſpaſmodick Affection from Place to Place. But beſides theſe various Sorts of Convulſions, which owe their Origine to ſome vitious Matter lodged ſome where or other in the Nerves, our Myology furniſhes us with ſome ſpaſmodical Affections of another Kind, which have their Origine chiefly from an ill Diſpoſition of the Muſcles. 'Tis obſervable, that the animal Spirits which are diſpoſed within the Muſcles, whenever they contract a vitious Temperament, either from the Brain or Blood, or ſometimes both, and are thus infected with ſome heterogeneous Particles, which will not ſuffer them to remain in a ſedate and quiet Condition, but being diſturbed, and always in Motion, are apt to make ſudden Irruptions of their own Accord from the tendinous into the carnous Fibres, and conſequently produce frequent and ſometimes moſt dreadful Convulſions.

This happens from two different Cauſes; firſt, when the Spirits being overcharged with the elaſtick Liquor or Juice do not continue any conſiderable Time within the Tendons, but making their Sallies at every Turn, produce thoſe frequent and ſudden, tho' ſhort Convulſions. Secondly, when the animal Spirits, tho' they remain in a State of Tranquility for ſome Time within the Tendons; yet making a diſorderly Eruption thence into the carnous Fibres, and being there expanded with ſome ſudden Force, cannot immediately be ſuppreſs'd, reduced into an orderly Motion, or brought back within the Tendons; but remain in a State of Expanſion even againſt our Will, and conſequently produce a laſting and painful Contraction, called in *Engliſh* the *Cramp*.

The firſt of theſe Diſaffections is called a ſpaſmodick Motion or Convulſion, which happens frequently in intenſly ardent and malignant Fevers. In Fevers 'tis to be obſerv'd, that when there is either a bad Criſis or none at all, there are certain heterogeneous Particles diſcharged from the Blood and nervous Juice, much vitiated, and that not only upon the *Viſcera* whoſe *Craſes* and Functions are deſtroy'd by them, but alſo upon the Muſcles, where being intermix'd with the Spirits, they put them into a violent Agitation; ſo that they are no longer capable of reſting and remaining quiet within the Tendons; but being divided, and as it were diſtracted, they make their Sallies in whole Bodies, as it were, into the fleſhy Parts, and there produce ſmall but frequent Convulſions.

In an inveterate Scurvy, the Spirits that are lodg'd within the Muſcles being overcharg'd by the Acceſſion of the elaſtick Juices, we ſee thoſe that are affected with this Diſeaſe not able to keep their Limbs long in the ſame Poſition, but are forced to extend and often change the Situation of their Hands and Feet; againſt which, Riding, Running, Leaping, and other laborious Exerciſes, are undoubtedly the beſt Remedies.

A Physical Disquisition of Angelus Victorius, *a Ro*man *Physician, concerning the Palpitation of th Heart, the Breaking of the Ribs, and other Indisp*sitions *of* Philip Nerius, *the Founder of a Ro*man *Oratory. Inscrib'd to Cardinal* Boromæu *Printed at* Rome, *by the Pope's Printer, in th Year* 1613.

THIS *Philip Nerius*, a *Florentine*, and the Founder of a *Roman* Oratory, was healthful, and had a good Habit of Body, from his Infancy upwards. He was lean in his old Age, and not diseas'd. In the whole Course of his Life very moderate, as to his Diet, of a chearful Countenance, and pleasant Conversation, very studious and devout. When about the Thirtieth Year of his Age, he was praying with great Zeal and Fervency, as it was the Duty of his Function, the Ardor of his Devotion was such, and the Exultation of his Spirits so great, that opening of his Breast suddenly, to give Way to the Violence of his Passion, something appeared on the Left Side upon his Breast, of the Size of a Hen's Egg, which he perceived without any Sense of Pain, and which was form'd without any other Appearance of external Violence.

Thus whenever he performed the ministerial Office, and was zealously affected in Prayer or Preaching, the Heart appeared to swell and extend the Breast, and the Palpitation was so forcible, as to be seen to shake the whole Body, and spread an unusual Heat over it, which would abate and be cooled by taking a little cold Water frequently; and this was the Method the good old Man pursued, and which preserv'd him alive to the Eightieth Year of his Age, when without any visible Disease, saving this I am now relating, he finish'd his Course with Ease and Satisfaction, the Eighth the Kalends of *June*, being *Corpus Chri* Day, and at Six a Clock the Evening f lowing the Body was opened, in order the Discovery of the Cause of the aforesa Disaffections, before the most eminent of Faculty of Physick then in *Rome*; as, G *manicus Fidelis*, *Franciscus Zazzara*, *Spi lus Beccius*, *Josephus Zerla*, *Joan. Bapt Guerra*, *Alexander Alluminatus*, *Marc. An nius Bellus*, Physicians and Surgeons, whom the following Things were obser

First of all, that in the fore Part of *Thorax*, in which that Protuberance conspicuous to all People, two of the su rior Bastard Ribs, to wit, the Fourth Fifth, appeared to be entirely broken, so divided, that one Part was distant fr the other; and which is wonderful, no yet from any Interval of Time were t united, as was usual; but so far asun and elevated, that externally they form the said Protuberance, and internally m the *Sinus* larger.

Being fir'd with a Curiosity to enqu further, we came with great Expectation view the Heart, as the Author or Procu of the aforesaid Fracture, which we fou of a Substance harder than usual, the C striction greater, and the Fibres more r and inflexible. The *Pericardium* or Cove of the Heart was without Water, cont to the State of Nature, the arterial Ve a double Size, and much harder than us

he Lungs not much alter'd, and the Liver nothing chang'd. The other inferior Parts we purpoſely omitted, out of Regard to the iety and virtuous Life of ſo good a Man, whoſe Converſation could give us no Suſ-icion to make ſuch Enquiry. Beſides, there were no Signs of any Diſaffection in thoſe arts, neither in the Head, which we for he ſame Reaſon left untouch'd.

This is an exact Account of the Parts, as ey were diligently and accurately obſer-ed by me and the reſt of the Faculty pre-ent, while the Body was opened before us, the Conſiſtory of St. *Mary's* Church, the ninth of the Kalends of *June*, in the Year our Lord 1595.

What appears in this Hiſtory worthy Ob-ervation is, firſt, the Palpitation of the eart, notwithſtanding which the ſaid *Phi-Nerius* lived for the Space of Fifty Years, at is, from Thirty, the Age in which he as ſeiz'd, to Eighty, in which he died. he next is the Elevation of the Left Side of e Breaſt. The Third is the Fracture of the ibs. The Fourth, the Magnitude and ardneſs or Tenſion of the Heart. The fth, the *Pericardium* being found without ater. The Sixth and laſt, is the double ze and Hardneſs of the arterial Vein.

From all which, ſince they appear to ex-ed the ordinary Courſe of Nature and iſeaſes, we have a Handle given us to en-ire whether this Caſe was preternatural, Diſeaſe of the Body, or ſupernatural and ivine; which our Author, after a long quiry, of which I ſhall give you the ads, reſolves into the latter, and makes a iracle of.

Firſt then for the Palpitation of the Heart, e ſhall enquire what it is, and how per-m'd. The Palpitation of the Heart is a eternatural Motion, or a Diſeaſe that is hement, troubleſome and noxious, occa-ning a Riſing and Depreſſion of that Part ainſt the Impulſe of the Will. This Pal-tation is made according to *Galen* from principal vital Faculty; and by ſome, a Celerity of Motion filling its Sub-nce with Air and a thin Vapour, which ws through it with Difficulty, and gives t ſudden Motion, it being as it were op-eſs'd and ſtifled with it, which produces is Diſeaſe. Upon which the Author proves that there was none of theſe, or any other natural Cauſe to be diſcovered of the Palpitation of the Heart of this *Nerius*.

The next Thing he handles is concerning the Fracture of the Ribs, in which he enquires from what Cauſes they uſed to be broke, what are the Conſequences, how they are united, and in what Time. The Ribs in Men appear from Diſſection to be Twelve on each Side; and if at any Time they alter, it is rather to Thirteen than Eleven; Seven whereof are the ſuperior Ribs, and articulated to the *Vertebræ* and the *Sternum*; and theſe are properly called the Breaſt Bones. The other Five are called the ſpurious or Baſtard Ribs, becauſe they are only joined to the *Vertebræ*, and do not reach the *Sternum* or Breaſt-Bone, and are rather Cartilages than Bones at all.

Of theſe Ribs, the Seven ſuperior are often broken, becauſe they are bony, which is not ſo common to the hind Part of the *Thorax*, as the fore Part: But the inferior Ribs, becauſe they are ſoft and cartilaginous in the fore Part, therefore cannot be ſo eaſily broken. The two uſual Ways by which the Ribs are broken are theſe, the one is when they are ſtruck or beat aſunder with the Contuſion of the external Fleſh; the other is when they are divided tranſverſly in two. The Cauſes of theſe Fractures are either by Falls, forcible Blows, Percuſſions, *&c.* but the Force of internal Cauſes were never known among the Ancients to do it, tho' the Moderns, more fruitful of Invention, have aſſign'd a Fracture of the Ribs, may proceed from the Motion and Palpitation of the Heart.

All Diſlocations and Fractures of the Ribs, where the Bones tend to the internal Parts, are accompanied with Inflammations, Fevers, Spitting of Blood, and other grievous Symptoms. Others, that are attended with ſlighter Symptoms, are eaſily and quickly healed; for the Bones of thoſe Parts are apt readily to unite and form a Callous in Fifteen or Twenty Days Time, which is quite different from the Caſe of *Philip Nerius*, whoſe Fracture never was cured; and therefore 'tis reaſonable to conclude, that this Fracture was not natural, not only from hence, but becauſe the Ribs that were broke in him were cartilaginous, and therefore impoſſible to

break. Secondly, becauſe the fractured Bones were without any painful or uneaſy Symptoms; he living fifty Years, ſo far free from Trouble or Diſturbance from it, that he injoyed a larger Pleaſure of Mind and Satisfaction of Health than before. The Third Reaſon is, becauſe this Fracture never united, or had any Tendency to unite, but was always in Motion, with the Palpitation of the Heart. The laſt is, becauſe there was no external Cauſe to procure this Fracture, neither Fall, Percuſſion, or other Violence, but the fervent Motion of his Spirits, and the dilating or Pleaſure of his Soul, excited from a Rapture of Devotion.

The learned *Fernelius* affirms, That the Ribs may be broken by the Force of the Heart's Palpitation, and moved out of their natural Situation, without having Recourſe to preternatural Cauſes, but to what may happen in the uſual Courſe of Diſeaſes. Such is the Force of Palpitation, ſays he, that it has frequently broke the Ribs adjoining to the *Thorax*, and often removed thoſe from their Situation which are placed upon the Breaſt; which Words can admit of no other Senſe than what follows, ſays our Author; the Force of the Palpitation is ſo great, that it may contribute to the Breaking of thoſe Ribs which adhere to the *Thorax*; but ſuch as are at a greater Diſtance from it, and have no Union with the *Thorax*, it may luxate or bend, but it can never break. There can be no other Meaning in what he ſays, if you either weigh his Words, or conſider the Nature of the Thing But you will meet with few other Phyſicians of his Time that will agree to what *Fernelius* aſſerts; for his Opinion is oppos'd by *Euſtachius*, *Rudius*, *Bellumenſis*, *Mich. Piſo*, *Carolus Petra Alba*, *Placentinus*, and others.

And ſuppoſe I ſhould admit *Fernelius*'s Opinion, that the Palpitation of the Heart had Power to break the Ribs, yet it would not anſwer to our preſent Caſe, becauſe the Elevation or Riſing of the Breaſt preceded the Fracture of the Ribs, as appears from the Relation of the Fact; ſo that the Breaſt was raiſed before the Palpitation was perceived. Therefore the Fracture of which we here ſpeak was without any natural Cauſe, either external or internal, and every Symptom that might attend any ſuch Cauſe, neither did it admit of any natural Cure. Wherefore it muſt be agreed to be Divine and Supernatural, and, without Diſpute, by the Believing will be allowed a miraculous Fracture.

Of what was, according to our Author, miraculouſly obſerved in Relation to the Breaſt of the aforeſaid Philip Nerius *Four Years after his Burial.*

WHEN the Grave of the ſaid *Nerius* was open'd Four Years after his Interment, in order to remove the Body at the Command of Pope *Clement* the Eighth, his Serene Eminency the Cardinal *de Medicis* being preſent, who was afterwards called *Leo* the Eleventh, and in the Preſence of ſeveral other great Perſonages, when the Body was expected to be putrified by Reaſon of the Moiſture of the Place, and the Length of Time in which it had laid, ſo that, according to the Courſe of Nature, it might have been rotten, or at leaſt decay'd, being preſerv'd by no Art, it was found entirely whole, without any Stench or Diſcolouring whatever, eſpecially in that Part which cover'd the Heart, and the whole Breaſt was in the ſame Condition as when it was juſt opened, being of a white Colour, ſoft to the Touch as a freſh Corps or *Carlaver*, as all the Aſſembly were Eye-witneſſes of; which, as it plainly appeared to exceed Nature, ſo it was acknowledg'd by all to be a ſingular Act of Omnipotency, and a miraculous Preſervation of the dead Body, as a Teſtimony that the ſame Power which had ſo wonderfully preſerv'd his Body from Corruption after Death, did maintain and ſupport him, notwithſtanding that ſtrange Texture of his Ribs, and Palpitation of his Heart, beyond the Power and uſual Courſe of Nature for ſo many Years during his Life.

Con-

Concerning the Motion of the Muſcles. From the ingenious Doctor John Mayow.

THat there is a certain nitroaereous Spirit transfer'd by Means of the Reſpiration into the ſanguineous Maſs, to which its Fermentation and Incaleſcency owes its Origine, has been ſhown by us in another Place; and now I muſt add in Relation to this ſame Spirit, which is drawn in by Reſpiration, that the ſame bears a conſiderable or the greateſt ſhare in the performing the animal Motions. Which Opinion, as maintained by me before, I continue to aſſert at this Time alſo; not becauſe that being devoted to any preconceived Hypotheſis, I reſolve, as 'tis commonly done, to defend it to the utmoſt, whatever it be, but becauſe I judge it moſt conſonant to Reaſon.

The Manner or Method by which Motions are performed is ſo obſcure, that its Diſquiſition has proved no leſs troubleſome to the modern Anatomiſts than in former Ages it did to the ancient Philoſophers, juſt as if Nature took Delight to expoſe our humane Frailty or Ignorance. Since even theſe Things which are every Day in our Hands, and we perceive with our own Eyes, ſeem nevertheleſs the moſt remote from our Apprehenſions and Underſtanding. Among theſe Things, Motion challenges moſt deſervedly its Place; for we are ſo far ignorant as to the Manner of its being performed, that ſcarce believing our own Eyes, its very Exiſtency is ſometimes called in Queſtion, it being one of the moſt celebrated Queſtions in Diſpute among the Schools, Whether there be any ſuch Thing as Motion? The Sophiſts were ſo very poſitive in former Ages that there was no ſuch Thing, that its very Exiſtency had been quite deny'd before this had not Motion it ſelf, in its very Action, been obliged to ſtand up in its own Defence, and convinc'd the Philoſopher. Now when all theſe Difficulties have been raiſed concerning Motion in general, in how much more Obſcurity is the animal Motion involv'd, where we ſee very bulky Bodies produce very ſtupendous Motions, and that of their own Accord, to our no ſmall Surprize.

'Tis beyond all Diſpute that the animal Motion is performed by the Contraction of the Muſcles; but in what Manner this their Contraction is performed, is ſtill much controverted by Authors. The moſt received Opinion nevertheleſs is that the Fibres of the Muſcles are inflated, ſo that being tumefied, or rendered broader in Breadth, they are contracted in Length. This Inflation of the Fibres is moſt ingeniouſly explained by the learned Dr. *Willis* in his Exercitation of Muſcular Motion a little aforegoing. Tho' that Hypotheſis be very curious, after all, in my Opinion, it does not in all Reſpects ſeem ſo conſonant to Truth; for firſt of all, this Inflammation of the Fibres is ſubject to ſeveral Difficulties, and ſuch as are not of the leaſt Moment; for in caſe it were ſo that the Contraction of the Muſcle proceeded from the Inflation of the Fibres, it would of Neceſſity follow, that the Muſcle being in its Contraction diſtended outwards, muſt ſwell up into a much greater Bulk, whereas it has been found by Experience, that a contracted Muſcle is drawn cloſer together within it ſelf, that it becomes hard, and that if it is not leſſen'd, at leaſt it is not tumefied. So much as is required for its Contraction in caſe the ſame be ſuppoſed to proceed from an Inflation of the Fibres, as it has been long ago obſerved by the learned Dr. *Lower*.

And tho' it ſeems as if in ſome Muſcles when they are contracted we can feel ſomething of a Tumour, this, in my Opinion, is nothing to their being tumefied ſo much as to the Bellies of the Muſcle being in its Con-

Contraction moved towards the fix'd or immoveable Tendon; ſo that this Aſcent of the Muſcle repreſents, though falſly, a Tumour, when it ſtrikes againſt our Hand when laid upon the Muſcle. Beſides that, if there were any ſuch Thing as an elaſtick Matter lodged betwixt the Ducts of the Fibres, which produced this Inflation as beforeſaid, how could it come to paſs that theſe Fibres ſhould fall or ſubſide again in an Inſtant, as it happens in the Twinkling of an Eye, and in the other different and momentaneous Contractions of the Fibres? For I cannot comprehend in what Manner this elaſtick Matter ſhould be able in a Moment's Time to cauſe an Inflation of the Fibres, and extricate it ſelf in the ſame Inſtant from theſe Ducts or Channels; for if it be ſuppoſed, that after this Matter is rarefied, the Paſſage is eaſied for it out of the Fibres, it would immediately puff through the Fibres without producing any due Inflation.

Furthermore, it ſeems not very probable that the Animal Spirits ſhould in the Relaxation of a Muſcle retreat out of the carnous into the tendinous Fibres, it being not eaſily conceived what it is that could diſpoſe or direct theſe Spirits into this Motion of receding or retreating. Beſides that, ſince, according to the Opinion of the ſaid learned Author, the Animal Spirits which make their Sallies into the Fibres, meet there with other Particles carried thither, and that in a very great Quantity, and immediately go together with them into a mutual Efferveſcency, it ſeems as if theſe Spirits would be either quite diſſipated, or elſe tranſmuted into ſomething of a quite different Nature from what they were before, and that conſequently they would not be qualified to renew ſuch another Efferveſcency. In Relation to the chief Part of the Muſcle that is contracted, it is very probable, that not the Fibres, but rather the Fibrils that run and are tranſverſly inſerted into them, are contracted, as ſhall be ſhewn hereafter.

As to what concerns the Intumeſcencies of the carnous Fibres, which is to be obſerved near the Place where any Ligature is made in them, it is to be noted, that this ſeems to owe its Cauſe rather to the Blood which paſſes through theſe Parts, than to the Motion of the Animal Spirits being interrupted; for in caſe ſuch a Fibre, wh it is in ſuch a State of Tumefaction, wounded, the Blood will come forth pl tifully. Beſides that this Tumour will co tinue near the Ligature, even after the Muſ being relaxed the Contraction ceaſes; which Time the Animal Spirits ſhould n according to Dr. *Willis*, break out forw from the tendinous Fibres, but on the co trary retreat backwards into them. How ever, I cannot but agree with the ſaid Au thor in this Point, *viz.* That the Contracti of the Muſcles proceeds from the Particl of different Sorts, being intermixed with the Compages of the Muſcles, and entrin into a mutual Efferveſcency.

I am not ignorant that the learned *Sten* in his Specimen of Myology, publiſhed no long ſince, is of Opinion, that there is no the leaſt Occaſion for the Acceſſion of an elaſtick Matter for the Contraction of th Muſcles, conſidering that the ſame, accordin to his Opinion, may be produced by the ſole Immutation of their Figure, *viz.* 'If a 'Muſcle from a *Parallelogrammum obliqu* '*Angulum* is changed into a *Parallelogram-* '*mum*, the Angles of which are not le 'acute, which is ſuppoſed to happen thus 'in the Contraction of a Muſcle, then is 'the ſame contracted in Length, and at the 'ſame Time tumefied, without the Acceſ- 'ſion of any new Matter. But it does not ſeem probable that the Fibres of the Muſcle ſhould be diſpoſed to ſuch a Motion without the Acceſſion of ſome Matter into them; for conſidering that the Compage of a Muſcle, before it is contracted, is lax or looſe, it ſeems as if the Fibres could not be brought outwards, but rather on the contrary inwards.

Again, if it be ſuppoſed that a Muſcle, after its Contraction, is of the ſame Bigneſs as before, and is not encreaſed by the Acceſſion of any new Matter conveyed to it; how comes it to paſs, that, in the State of its Contraction, it becomes ſo denſe and hard, as it is obvious to every Body by only laying his Hand upon the Part where the Contraction of the Muſcle is made?

Laſtly, what is it that could contract the Fibres, and bring about this Immutation in the Muſcle, if there were nothing of an ad-

ditional Afflux into that Part? Beſides at, it is very evident that a certain new latter is through the Nerves convey'd to e Muſcle, without which the Contraction the Muſcle cannot be accompliſhed; for caſe that Nerve which is directed to a rtain Muſcle is cut aſunder, there will be Contraction in that Muſcle for ever ter.

It cannot be denied, 'tis true, but that in ſe it be taken for granted that there is an ceſſion of ſome certain Matter which flows to the Muſcle, produces its Contraction, at then this Contraction may be accomliſhed by the ſole Mutation of its Figure; r this Muſcle, without undergoing any her Change, may, according to the Acſſion of the new Matter which it receives, extended and inflated by that Matter; d when this Variation, as to its Figure, ppens in the Muſcle, it will tumefy in readth, but be contracted in Length; and us a Muſcle may be ſhortned without its bres ſuffering any Contraction.

But whether this Variation may take lace in a Muſcle, and whether its Conction depends on that alone, I will not tend to determine; though, according my Opinion, the Tumefaction in a conacted Muſcle does not ſeem ſo much as is quired to produce its Contraction after at Manner. Beſides that, I cannot conive or ſee what Part of the Muſcle it is at is affected by the Impulſe of the moing Matter in ſuch a Contraction, ſince it ould be requiſite, that rather membranous eſicular Bodies, than the muſcular Strings, ould ſuffer this forcible Contraction; hereas the Strength of the Muſcle ſeems to iſe rather from the Fibrils, and its Strings, an from any veſicular Bodies or Memanes.

In the Anatomy of the Muſcles, the firſt hing that offers it ſelf to your Sight, is e membranous Integuments wherewith ery Muſcle is covered, agreeable to which e Series of the carnous Fibres make their ppearance, which being Parallels themves, are inſerted with oblique Angles in the oppoſite and parallel Tendons, acrding to the Obſervations made firſt of all *Steno*. Further you may obſerve the oſt ſurprizing Series of an almoſt infinite Number of membranous Fibrils, which being alſo parallel to one another, do paſs tranſverſly the carnous Fibres, but with oblique Angles; *viz.* Theſe Fibrils are inſerted into the carnous Fibres after the ſame Manner, but in an oppoſite Situation, as the carnous Fibres are into the Tendons; and as the carnous Fibres by their cloſe Conjunction ſeem to form the Tendons, ſo the Collection of the Fibrils ſeems at leaſt in ſome Meaſure to make up the Fibres themſelves.

It has been the conſtant Opinion of Authors writing on this Subject, that the carnous Fibres of the Muſcles were chiefly thoſe that entered into a Contraction; but, according to our Opinion, 'tis not the Fibres, but the Fibrils which are inſerted tranſverſly into them, which have the greateſt Share in the muſcular Contraction, as may be gathered from very probable Indications: For in caſe this Contraction did lie in the carnous Fibres, then it would be required to perform the due Contraction of a Muſcle, that the Fibres ſhould be much more ſhortned in Length than the Muſcle it ſelf; for the Fibres not being diſpoſed according to the Length of the Muſcle, but inſerted obliquely into the Tendons. Hence it follows, that the Contraction of the Muſcle muſt be much leſs than the Contraction of the Fibres; whereas, to make a due Contraction of a Muſcle, it is required that the Fibres be much more contracted than the Muſcle it ſelf, and that, according to my Opinion, there is no ſuch great Contraction of the Fibres actually exiſtent in the Motion; for beſides that, in the Diſſections of living Animals there is no ſuch Contraction of the Fibres to be obſerved, in caſe the carnous Fibres were tumefied to ſuch a Degree, the Muſcle muſt of Neceſſity augment to a great Bulk, which we ſee does not happen ſo.

But if we ſuppoſe the Contraction of the Muſcle to be performed by the Fibrils, there is not ſo much need of ſo great a Contraction and Intumeſcency to the Length of the Muſcle, as may be ſeen; ſo that the Contraction of the Muſcle is equal to the Contraction of the Fibrils. Now it being altogether conſonant to the conſtant Courſe of Nature to take the ſhorteſt Way in her Operations, 'tis very probable alſo, that the

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Contraction of a Muſcle is performed rather by the Contraction of the Fibrils, than that of the Fibres.

Add to this, that the Fibres being very ſmall and very ſhort, their Contraction even to one Half will ſcarce be remarkable; for ſince all theſe Fibrils ſuffer Contraction at once, it happens in the ſame Manner as if the carnous Fibres were extended according to the Length of the Muſcle, and were forced together into many Corrugations, which Contraction of theirs, though very conſiderable in it ſelf, might be made without any remarkable Intumeſcency of the Muſcle. To this, I think, I may add, that the Fibrils, when ſhortned, do draw and pull together the carnous Fibres; ſo that it is moſt probable, that the Contraction of the Muſcle is performed by them, conſidering eſpecially, that when a Muſcle is contracted, it is drawn very remarkably together, and becomes hard, which I don't ſee how can be effected any other Way, than by the Contraction of the Fibrils.

Beſides, it is the conſtant Courſe of Nature to accompliſh her Operations by the leaſt Means that can be; ſo that the Fibres ſeem to be too thick and rude for the chief Contraction of the Muſcle, and rather look deſigned for the Paſſage of the Blood, than to perform any Animal Motion. To this may be referred alſo, that the Shortneſs, as well as the almoſt infinite Number, of the Fibrils, does not a little conduce to the Strength of the Muſcle it ſelf, and to the performing of their Contraction with the greater Force. To be ſhort, whether we conſider the Number, Site or Situation of the Fibrils, 'tis evident that they are much better adapted for the Performance of the muſcular Contraction, than the carnous Fibres; and this is further confirmed by Autopſy it ſelf; for as far as I have been able to make any Obſervations upon the Inſpections of living Animals when diſſected, the carnous Fibres do, in the Contraction of the Muſcle, draw nearer to one another no otherwiſe than if they were attracted by the tranſverſe Fibrils, that they are not ſhortned themſelves, but ſeem to be ſo only through the Contraction of the Fibrils.

What concerns the Ligature made at both Extremities of the carnous Fibres, where-upon the muſcular Contraction does ce and the Fibre does, as it uſe to do, riſe i a Tumefaction, as it has been obſerved Dr. *Willis*. This I ſuppoſe to happen th Becauſe the Motion of the Blood, and the Animal Spirits, is interrupted by th Ligatures, the Influx of which is neceſſ towards the performing of the Contract of the Fibrils.

Having already endeavoured to ſhow t the muſcular Contraction was chiefly p formed by Means of the Fibrils, I muſt n enter into a ſhort Enquiry of the Ca which produces this Contraction of the brils.

'Tis beyond all Diſpute that the Influx the Animal Spirits is abſolutely neceſſary the performing the Functions of Motio foraſmuch as we ſee that when a Nerve obſtructed or cut off, the Muſcle into whi the Nerve is diſtributed can't perform Contraction: But notwithſtanding this, Inference is to be drawn from thence, th this Contraction of the Muſcles does depe altogether on the Animal Spirits, ſince the are alſo other Particles required, carried th ther from the ſanguineous Maſs, to accom pliſh theſe Functions; for it being evide that the arterial Blood does flow to t Muſcles with a full and more plentif Stream than to the other Parts, and that a greater Quantity than what is required f Nutrition, eſpecially in the more viole Motions, we may reaſonably conclude, th the arterial Blood does in its Paſſage depoſ its Share as much as is required or neceſſa towards the performing of the Contracti of the Muſcles. Beſides that, the Structu of the Muſcles is ſuch, that they dra themſelves together in their Contractio and by that Means very much promote t Motion of the Blood, which is the Reaſo why, when we run very faſt, we find o Blood put into a quick Motion.

Of this you may make a very eaſy Exp riment in the cutting the middle Vein the Arm, which being opened, if you co tract the Muſcles that are annexed to t Cubit, which may be done by making Conſtriction there with bending the Fing of your Hand; for thus you will ſee t Blood which is expreſſed from the ſaid Mu cles by this Contraction, ruſh out wi mu

with Impetuoſity from the Vein; and this Acceleration of the Motion of the Blood by the contracted Muſcles ſeems not to be the Effect of Chance, but of a peculiar Contrivance of Nature, *viz.* that the moving Particles of the Blood may be ſupplied from thence to the Parts that are to be moved, and after theſe are ſeparated, the remaining Part of the Blood may, by the Conſtriction of the abbreviated Muſcle, be expelled as it were with a Propulſation, in order to enable it after it has been provided with a new Supply, to make good what was ſpent before.

What we have ſaid juſt now, is further confirmed by another Experiment made by the ingenious *Steno*; for, according to his Obſervation, it is obvious, that a Muſcle can't be contracted in caſe that a Ligature be made on the Artery which is diſtributed into it, ſo that the Afflux of Blood into the ſaid Muſcle be intercepted by the afore-mentioned Ligature.

According to my Sentiment, the main Uſe of the muſcular Fleſh is to ſeparate certain Particles from the ſanguineous Maſs, ſuch as are neceſſary for the Contraction of the Muſcles; for 'tis obſervable, that it is the proper Function of all Sorts of the *Parenchymata* to ſeparate ſome Particles of a peculiar Kind from the Maſs of Blood by Way of Percolation, as is manifeſt in the *Parenchyma* of the Liver, of the Kidneys, and others of the ſame Kind; and therefore it is very probable, that the *Parenchyma* of the fleſhy Part, which is annexed to all the Muſcles, is contrived and made for the ſame Purpoſe, *viz.* to ſeparate by Percolation certain Kind of Particles, ſuch as are neceſſary to the performing the Contraction of the Muſcles.

The better to diſcover the Structure and Uſe of the muſcular Fleſh, let us examine a little in what Manner the Blood takes its Paſſage through the fleſhy Parts. I cannot agree in Opinion with thoſe that maintain an Extravaſation of the Blood. They alledge in Behalf of this Opinion, That there would be no ſuch Thing as Nutrition of the Parts, in caſe the Blood was detained cloſe within its proper Veſſels; for, ſay they, how can a Rivulet render the adjacent Meadows fertile, unleſs it overflows its Banks, ſo as to leave its Particles that are to render them fertile behind it? But this ſuppoſed Extravaſation, if the Blood ſeems to be a Thing ſo confuſed, that there is but little Reaſon to believe or imagine how the ſame ſhould take Place in that moſt exquiſite Fabrick of the animal Body, where every Thing is form'd with the moſt ſtupendious Contrivance and due Order.

Neither can I conceive in any Way how the extravaſated Blood penetrates the very minute Orifices or Apertures of the Veins; for if the extravaſated Blood be ſuppoſed to be diffuſed through the whole Body or Subſtance of the Muſcles, it ſeems as if the Extremities of the Arteries and Veins muſt ſuffer a Compreſſion from the circumambient Blood, ſo that the Blood would not be able to enter the Orifices of the Veins thus cloſed up by this Compreſſion. Beſides, that there is no ſuch Thing as an extravaſated Blood in the Muſcles, is manifeſt from thence, that the Blood which is carried to a Muſcle where a Wound is given, does not break forth all at once, which muſt of Neceſſity happen, in caſe the extravaſated Blood were diffuſed through the Subſtance of the Muſcle.

In Reference therefore to the Paſſage of the Blood through the Muſcles, we may rationally conclude, that the capillary Arteries and Veins are conjoined together by certain Veſſels of different Kinds, ſo that there is one continued Duct or Communication betwixt them. 'Tis my Opinion, that the Extremities of the Arteries do terminate in ſome peculiar Veſſels, which immediately from their Beginning are propagated into certain Ducts, or rather infinite membranous Veſſels, conjoined together by various Anaſtomoſes or Inoſculations, and that the Propagations of theſe veſicular Bodies being conjoined at laſt in one Duct or Channel, do terminate in the open Orifices of the Veins, ſo that the ſanguineous Maſs being thus carried through ſo many Windings and Turnings, it bares ſome Reſemblance to an Extravaſation. 'Tis alſo very probable that theſe Ducts or Collections of the veſicular Bodies are extant in each Fibre in particular; for in the Diſſections of living Creatures, it has been obſerved, that we make a Section in the Interſtices of the Fibres without any Appearance of Blood, whereas we ſee in

the ſlighteſt Wound made in any of the carnous Fibres the Blood follow immediately.

'Tis further to be ſuppoſed, that this Collection of the ſanguiferous veſicular Bodies makes up the main Part of the muſcular Fleſh; ſo as to what concerns the ruddy ſubſtantial Part, it ſeems to be nothing elſe but an Effuſion of the Blood, which being coagulated, adheres or grows into thoſe Veſicles; for whilſt the ſanguineous Maſs takes its Paſſage through theſe Meanders, and that with an even and eaſy Courſe, the thicker Particles, which are ſomewhat ſlower in their Motion, are ſeparated, and adhere or grow to the Sides of the *Veſiculæ*, which at other Times, *viz.* when the Blood runs with a more rapid and impetuous Courſe, are carried along with it, whence it is, that in Burning Fevers, as alſo in frequent and violent Exerciſes, the muſcular Parts being bereaved of theſe, the Body becomes emaciated by Degrees.

As to the Uſe of the *Parenchyma carnoſum*, it is very probable that the ſaid *Veſiculæ*, together with the thick Part of the Blood that adheres to them, are inſtead of ſo many *Colateria* or Sieves through which the moving Parts of the ſanguineous Maſs are ſeparated by Percolation, as has been intimated before.

Add to this, that the *Parenchyma* of the Fleſh being turgid with Blood, ſuffers a Compreſſion by the Conſtriction of the contracted Muſcle, and the natural Subſidency of the Parts; whence it is, that the moving Particles, as it were by a ſtrong Expreſſion, are forced into the Parts to be moved, to perform the Functions of Motion.

Concerning the Nature of the moving Particles that are ſeparated from the Maſs of Blood, 'tis our Opinion, that they are of a ſaline ſulphureous Nature; for I believe, that the ſulphureous and ſaline Particles being, by their continual Fermentation in the ſanguineous Maſs, raiſed to the higheſt Degree of Volatility, and intricated within one another, are ſeparated from the Blood by the Help of the muſcular *Parenchyma*, and diſcharged into the Parts that are to be moved in order to their Contraction.

For it muſt be obſerved, that when we uſe violent Exerciſes, we ſhall be ſenſible of the Loſs of a conſiderable Part of [illegible] and that by continual Labour it will be entirely waſted; whereas on the contrary, ſuch Animals as are idle, and not employed in hard Labour, will grow fat apace, ſo as to adhere to the Muſcles plentifully. Hence it is, we may rationally conclude, that the ſulphureous Particles of the Blood, of which the Fat conſiſts, do alſo contribute their Share towards the performing of the Contraction of the Muſcles, ſince thoſe Animals that are emaciated by continual Labour, ſeem to loſe their Fat for no other Reaſon, but becauſe the ſulphureous Parts of the Blood, or the Fat, are ſpent and conſumed in the muſcular Contractions; whereas when the Parts to be moved have ceaſed for a long Time from being contracted, the ſulphureous Particles are not conſumed in the Contraction of the Fibrils, but by Means of their proper Veſicles, are carried to their peculiar Receptacles; all which, if conveyed thither in a ſufficient Quantity, make or form what we call the Fat.

But that the adipous Particles are carried by ſome peculiar Veſſels, is apparent from thence, becauſe the ſanguiferous Veſſels that are diſperſed through the Body, or Subſtance of the Muſcles, don't reach ſo far as to the Fat, which moſt commonly adheres to all the Muſcles; ſo that the ſulphureous Particles whereof the Fat conſiſts, can't proceed immediately from the Blood, but they muſt of Neceſſity be carried thither from the interior Part of the Muſcle by ſome peculiar Veſſels. Beſides that, it is evident from Anatomical Obſervations, that there are certain membranous Veſſels diſperſed here and there thro' the Subſtance of the Fat, which are propagated, and reach to the interior Parts of the Muſcles.

The Fat being thus laid up in its proper Repoſitories or Receptacles, though in all Probability it does not return towards the Parts that are moved, muſt nevertheleſs not be looked upon in the leaſt as an uſeleſs Excrement, but as ſubſervient to various Uſes, as, to ſupport the tender, and lubricate the other Parts: But of this we ſhall have Occaſion to ſpeak more at large from the [illegible] Author, when we come to treat of the Animal Spirits, *&c.*

Fig: 8. of Sutures.

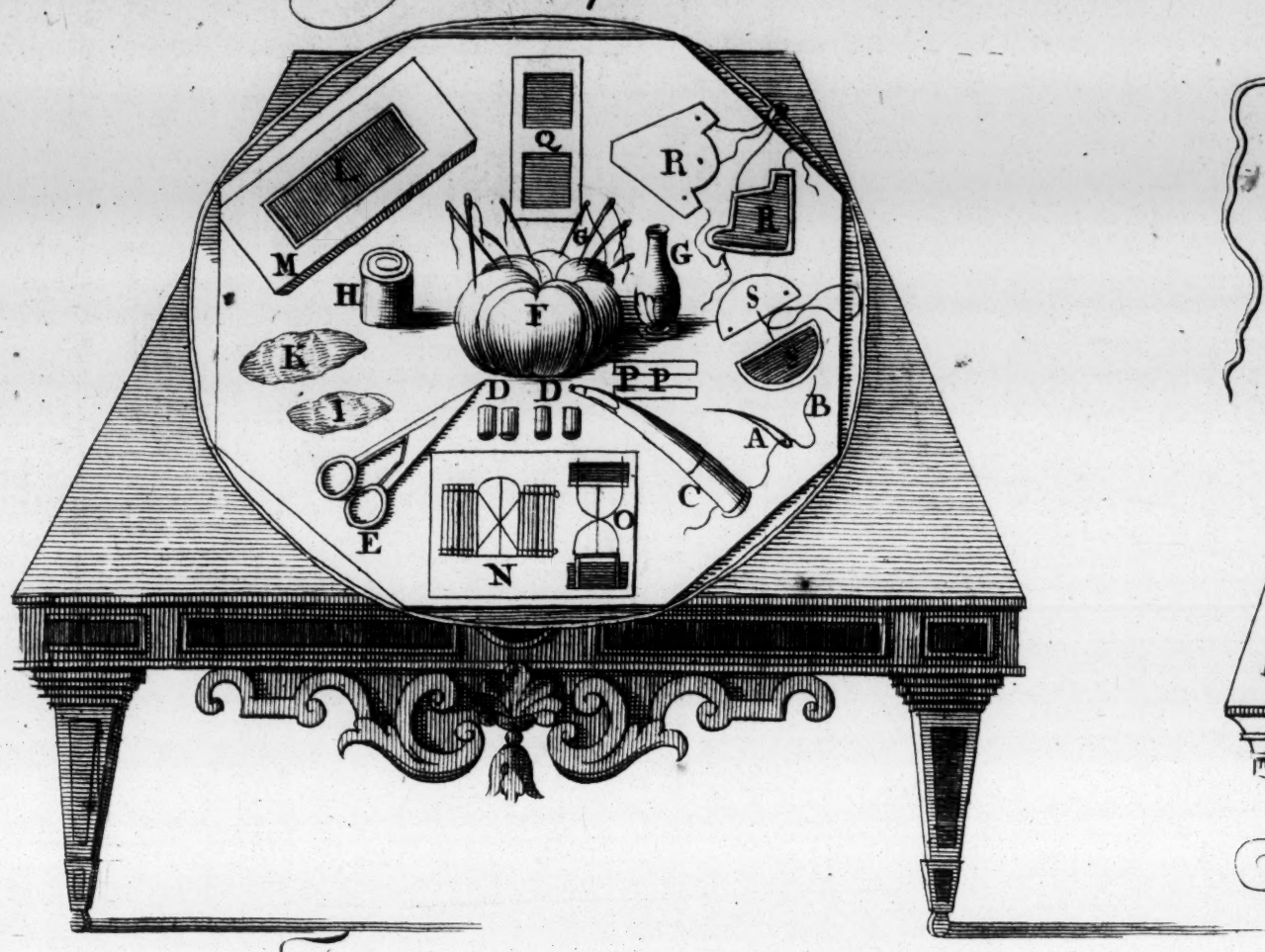


Fig: 36. For ye Corners of ye Eyes.

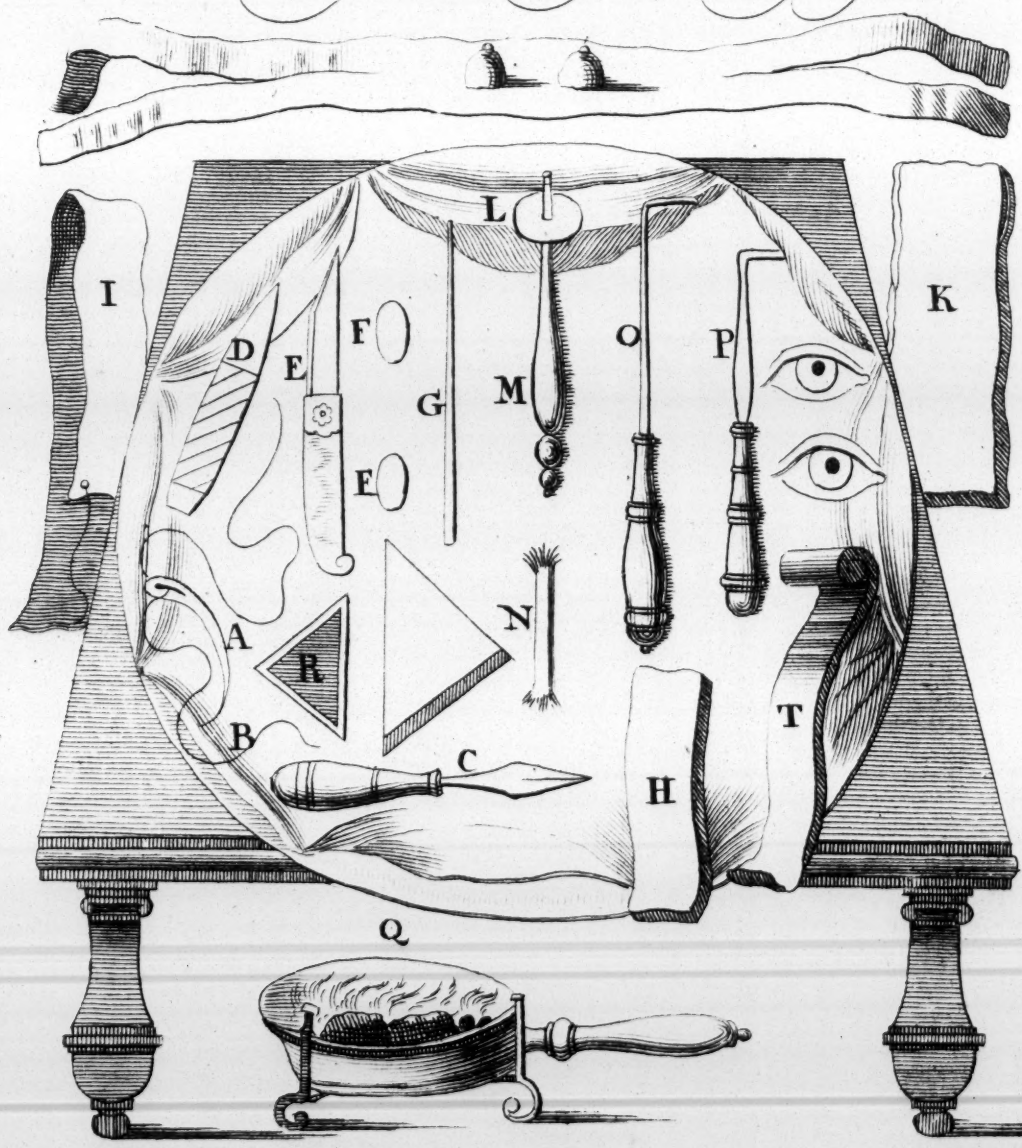
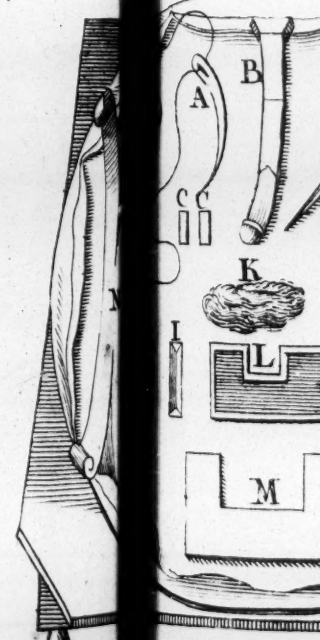


Fig: 39



Figures of Instrum Bandages. Pl

33. For ye Eyelids.

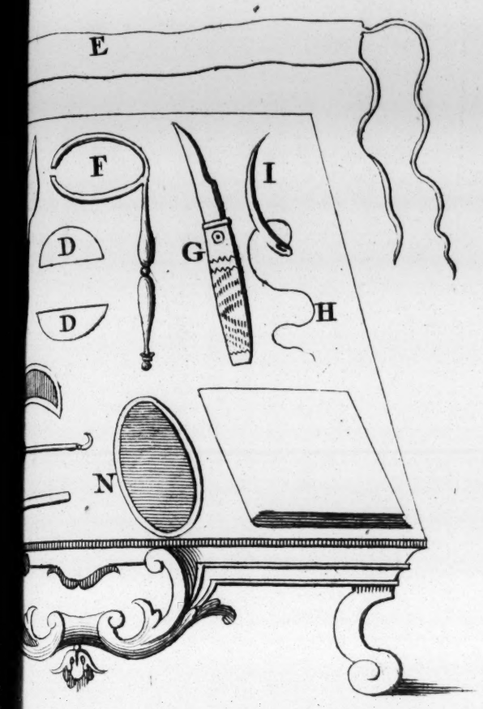


Fig: 34. For ye Eyelashes.

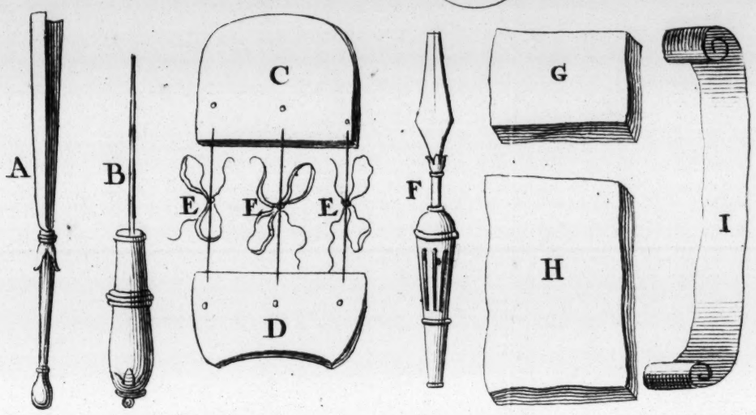


Fig: 35. For ye Tunicles of ye Eyes.

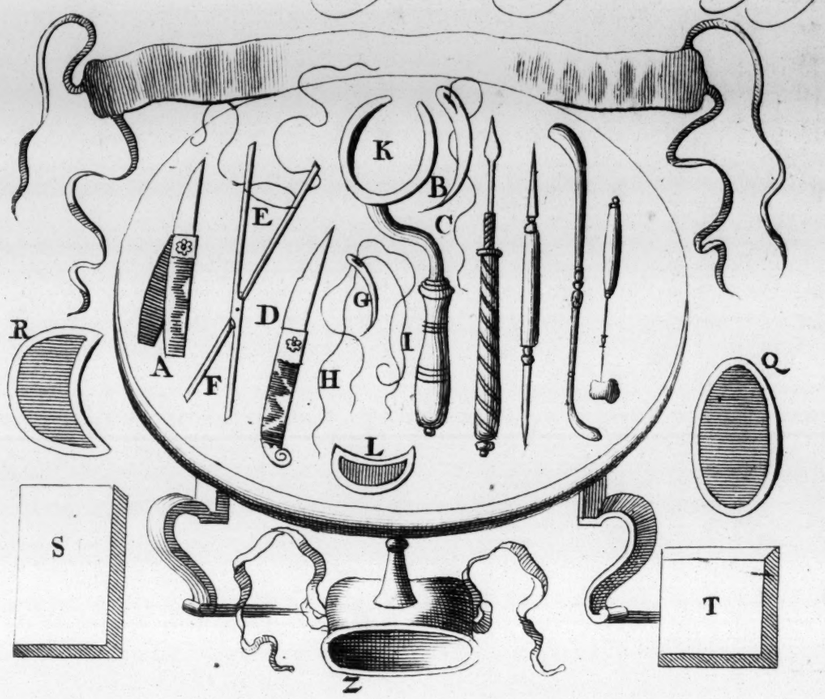


Fig: 39. For ye Hare Lip.

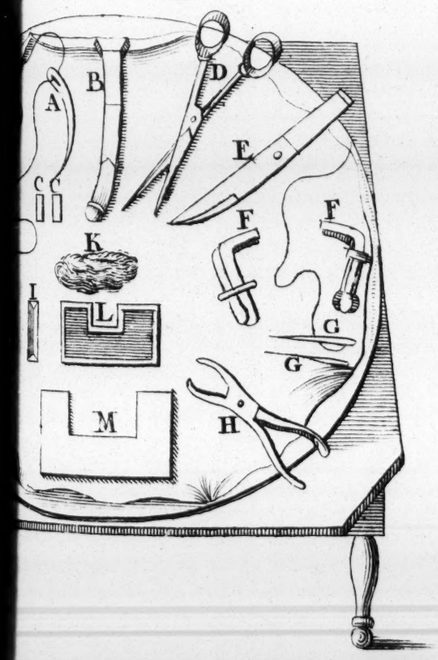


Fig: 41. For ye Tongue & Uvula.

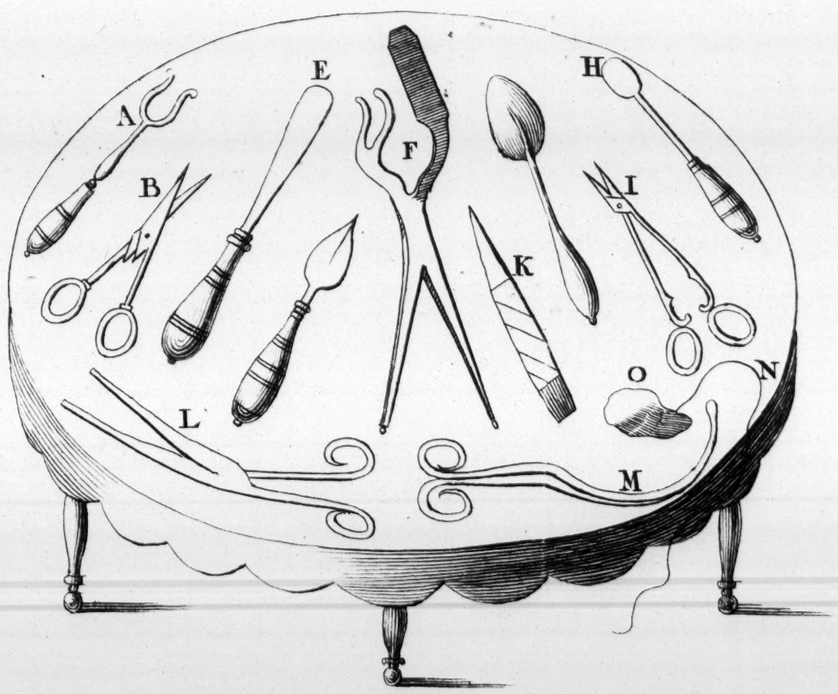
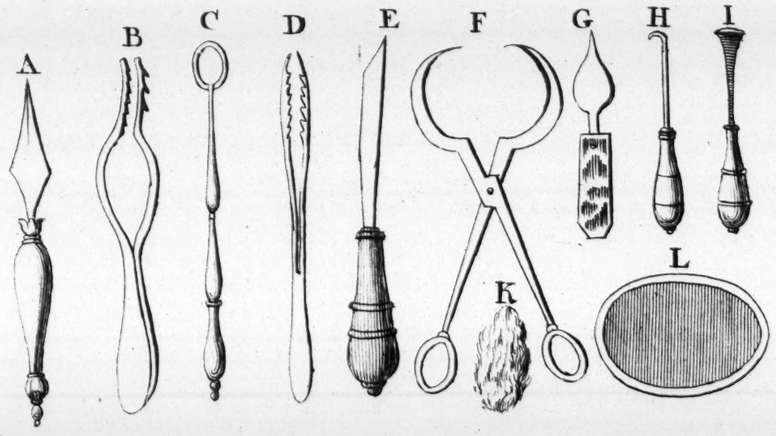


Fig: 42 For ye Ears & parts adjacent.



Bandages. Plaisters &c. for ye uses above. From Dion. Ste. Hillaire Le Clerk Etmuller. Vaugion &c.

of the ſeveral Diſeaſes of the Muſcles, and their Cures; and firſt of the Chirurgical Operations belonging to the Suture, *the Eye-lids, the Eye-laſhes, the Tunicles of the Eyes, the Corners of the Eyes, the Ears, the Tongue and* Uvula, *and the Hare-lip. From Mr.* Dion's *Courſe of Chirurgical Operations, demonſtrated in the* Royal Garden *at* Paris.

Of the Suture, *Fig.* 8.

THE *Suture* is a Chirurgical Operation, which, by Means of a threaded Needle, contributes to the reuniting and reſtoring to a perfect Continuity the Parts of imal Bodies that are violently divided, ng performed while the Part is freſh eding.

The Word *Suture* is taken in Two Senſes, her for a Convexion of the Bones of the *nium* or Skull, which are joined together a Sort of *Saw Teeth*; or elſe it is underod to be a ſtitching or ſewing up of ounds, in which Senſe now we ſhall treat it, as the beſt Means that can be uſed for reuniting of Wounds juſt made, when ndage, favoured by the moſt advantageous ation, cannot compaſs that End; beſe the Lips of the Wound being brought approach each other by the Aſſiſtance of Needle, which returns the Extremities the Fibres to their former State in which y were before their Breach and Separan. The Ancients invented ſeveral *Sutures*, ich they reduced to Three Sorts, the Inative, Reſtringent, and Conſervative.

he *Incarnative* is ſo called, becauſe that reuniting the Edges of a Wound, and ining them ſo joined by means of the ead drawn thro' them by a Needle, it es them to conglutinate, knit, heal over, and reaſſume their priſtine Continuity. Theſe Incarnative Sutures are ſubdivided into Five Species, which are, the Interſected, the Tortile or Threaded, the Pegged or Feathered, that with a Buckle or Claſp, and the Dry Suture. Of theſe Five Species we ſuppreſs Two of them, as too cruel, and wholly uſeleſs, which are the Pegged or Feathered, and the Suture performed by a Buckle or Claſp. The former is term'd the Pegged or Pinned Suture, when perform'd with Wooden Pins, and the Feathered, when done with the Quills of Feathers. The Operator threads Two or Three Needles with a double Thread, which is paſſed through the Edges of the Wound, making Holes at a Finger's Diſtance from each other, and in the Loops of each of theſe Threads he fixes a Wooden Peg or Pin, or the Quill of a Feather, and binds them with the Ends of the ſame Thread, that the Quills may keep the Edges of the Wound cloſed, but preſſing them ſo as to cauſe continual Pains and Obſtructions, followed by ſeveral miſerable Accidents. To perform the other Operation, the Ancients had curv'd Buckles, pointed at both Ends, one of which they thruſt into the upper, and the other into the lower Part of the Wound, to cloſe its Lips. You will eaſily judge by this Recital of theſe Two Sutures, how cruel, and at the ſame Time how uſeleſs they were, ſince in the Caſes where they ſeem moſt neceſſary, as in deep Wounds,

and in Wounds of the Tendons, they expoſe the Patients to terrible Convulſions, *&c.* I ſhall proceed no farther on them, but explain in as ſhort a Manner as poſſible the Three others, which are, the Interſected, Threaded or Tortile, and Dry Sutures.

The Name of *Reſtringent* is given to a Sort of *Sutures* by which they pretend to ſtop the Blood in large Wounds, where there is an Aperture of the more conſiderable Veſſels, to which End ſeveral Kinds of them have been deviſed, of which Number are the Shoemakers, Taylors, Skinners, and other Sutures, every one of which is more uſeleſs than the other; for if we do but even a little reflect on the *Suture*, we cannot help condemning it. Suppoſe then, that the Skin was ſo exactly ſewed up, that the Blood could not come out, would it not eſcape under it through the Aperture of the Veſſel, from whence it would run into all the diſtant Spaces betwixt the Muſcles, which would ſwell, putrefy, and gangrene the Part? So that this Suture is not retrenched without juſt Reaſon; and the rather, becauſe there are other more certain and leſs painful Means of ſtopping Blood. The Name of *Conſervative Suture* is beſtowed on that which in large Wounds, where Part of the Subſtance is loſt, prevents the wide Seceſſion of the Edges of the Wound from each other; but a Bandage ſufficing to that End, 'tis needleſs to run a Parcel of long Threads a-croſs a Wound, where they fatigue us in the Dreſſing, and by their Attraction, inceſſantly irritate the Motion and natural Bent of the Parts, till they are cut or break; wherefore I diſmiſs it with the Reſtringent Suture.

The ſole Advantage which we draw from Sutures is Re-union, in the procuring of which Two Things occur, the Surgeon and Nature. On the Surgeon's Part, the Obſervation of Two Circumſtances is abſolutely neceſſary: Firſt, to draw the Lips of the Wound to a mutual Cloſure; and Secondly, to keep them in that Situation: And on the Side of Nature, ſhe is obliged to make Uſe of her Balſam, which is Blood, as the moſt proper Cement to conglutinate and mutually reunite the Lips of the Wound. Be not ſurprized that I put the Surgeon before Nature; for ſhe would labour in vain on a Wound, if his Induſtry did not reduce the Parts to ſuch a State as is reparable by the Motion and Juices provided by her wiſe Oeconomy to that End. In order to conceive how this Re-union happens, we muſt be informed, that all the Parts of our Bodies are compoſed of nothing but Tubes, perpetually tranſverſed by Liquors, which endeavour to diſperſe themſelves to all the Parts, and by continual Impulſe incline to circulate from one Part to another; ſo that as ſoon as the Surgeon has cloſed the Lips of the Wound by Suture or Bandage, and ſubjected them to this Diſpoſition, the Humours which are perpetually attempting to paſs and repaſs from one Lip to the other, finding the Conduits broken, flow out of the Veſſels, and their moſt glutinous and balſamick Particles ſtopping in the Intervals, which always remain in a Wound even the moſt exactly cloſed, there condenſing and indurating by the Heat of the Place, and withal joining to the Two Sides of the Wound, they keep themſelves ſo united, that the Extremities of the Fibres and capillary Veſſels, mollified and nouriſhed in a ſmall Time, proceed to a perfect Continuity of the ſame Texture as before their Diſunion. In tranſverſe Wounds, we cannot diſpenſe with the Uſe of Sutures, and eſpecially in thoſe which Bandage cannot reunite; for when ſuch Bandages as the Uniting and Incarnative are ſufficient immediately to cloſe the Lips of a Wound, the Patient ought to be ſpared the Tryal of all other Means. Lacerated Wounds, to which Pieces of Fleſh hang, as thoſe of a Noſe or Ear half cut off, alſo require ſewing; but it is a Miſtake to pretend to apply Suture to ſuch Parts as the Noſe and Ears, when they are entirely ſeparated from the Body, though ſome Authors have adviſed it. 'Tis alſo ridiculous to believe that 'tis poſſible to repair the Loſs of a Noſe by the immediate Subſtitution of a Bit of Fleſh cut out of the Thigh or Arm, and ſhaped like Noſtrils, though ſome Authors tell us they have try'd it with Succeſs.

Though *Sutures* are infallible Means of the Cloſure of Wounds, and procuring their Reunion, here are yet ſome Occaſions in which the Uſe of them are interdicted us. As, 1. In Wounds ſuſpected to be invenomed

In Wounds of the Breaſt; 3. Thoſe attended with violent Inflammations; 4. Contuſions; 5. Wounds where the great Veſſels are opened, which are to be cloſed by Ligature or Aſtringents; 6. Where the Bones appear, and an Exfoliation is expected; 7. In Wounds accompanied with a ſignal Loſs of Subſtance, becauſe it is neceſſary to draw out the *Pus*, or Matter, in order to the growing again of the Fleſh.

When a Wound is not of any of the Kinds laſt mentioned, and a Surgeon is convinced of the Neceſſity of a *Suture*, before he proceeds to the Operation, beſides what is uſual in other Occaſions, he ought neceſſarily to be provided with a Needle as deſcribed at *A.* with Thread as at *B.* and a ſmall Tube or Pipe *C.* The Thread ought to be even, round, equal, ſoft, and of a proper Fineneſs or Courſeneſs according to the Needle. *Florentine* Thread is to be preferred to Silk. The Tube ought to be of Silver, cut through to give Paſſage to the Needle, and cleft at the End to let the Thread through.

In performing of a *Suture*, Six or Seven General Rules are to be obſerved: 1. To cleanſe the Wound well; 2. To join the Lips by a Servant, that may hold them cloſe during the Operation; 3. Not to take in too much of the Skin; 4. Not to penetrate the Fleſh deeper than is neceſſary; 5. To leave a moderate Diſtance betwixt the Stitches; 6. To avoid the Puncture of the Nerves, Membranes, and Tendons. The 7th conſiſts in ſometimes venting the lower Part of the Wound to make it an Iſſue. Thus inſtructed, we may ſet our Hands to the Work; but the *Interſected*, the *Tortile* or *Threaded*, and the *Dry Sutures*, are differently performed, which I ſhall here demonſtrate.

The *Interſected Suture* is ſo called, becauſe at each Stitch the Needle makes, the Thread is cut after having made a Knot. This Operation is performed Two Ways, either with a ſingle or double Thread. To perform the former, the Operator takes his threaded Needle in his Right Hand, and the Tube in his Left: Some will have the Point dipped in Oil, that it may give the leſs Pain at its Entrance: Then ſupporting the ſuperior Lip of the Wound with the Tube, the Operator puſhes in the Needle, and when it is paſſed quite through the Hole of the ſaid Tube, he draws it quite through; after which, doing the ſame Thing to the inferior Lip, he paſſes the ſame Thread through that from within outwards: If the Wound requires ſeveral Stitches, he makes as many as are neceſſary, and afterward knots each Stitch ſeverally, taking Care not to tie the Knot on the Wound, but at the upper End of it. Some Surgeons place ſmall Linen Boulſters, as at *D. D.* Others ſew with a double Thread, and after having ty'd it, cut it with the Sciſſars *E.*

In order to the exact Performance of theſe *Sutures*, the Surgeon ought to be provided with the Cuſhion *F.* ſtuck with Needles *G.* of all Sorts, ſtraight, curved, large, ſmall, round, flat, and triangular, threaded with ſeveral Sorts of Thread, to the End he may have ready before his Eyes what is proper to ſew up the Wound, otherwiſe he will be frequently obliged either to make Uſe of an improper Needle, or to wait the coming of one ſent for.

After Performance of the Suture, there are yet ſome eſſential Circumſtances to be obſerved; the principal of which is, that after having cloſed the Lips of the Wound as exactly as poſſible, to provide for their remaining in the ſame State. Several Authors adviſe to apply to the Wound a Powder called the *Conſervatrix* of Sutures, compoſed of glutinous and viſcous Ingredients, ſuch as Maſtick, Myrrh, Bole, and Aloes, ſuppoſed in the Viol *G.* Others aſſert the beſt Remedy to be the nutritive Juice, which repairing to the Part, procures the Reunion. And *Arcæus*'s *Balſam*, which refers to the little Pot *H.* is uſed, and with that the ſmall Pledget *I.* is charg'd and clap'd on the Suture, and afterwards covered with the great Pledget *K.* which is large enough to extend over the Knots, to the End that the Plaiſter not ſticking to them, the Dreſſing may be taken off without Pain. Next is laid on the Plaiſter *L.* which ought to be compoſed of viſcous and aſtringent Ingredients, ſuch as that for Ruptures; then the Boulſter *M.* moiſtened in ſome Liquor, which fortifies, and reſiſts Putrefaction.

The Tortile or Threaded Suture received its Name from the Operator's leaving the Needles in the Wound, and winding the Thread about them in the ſame Manner

that

that Taylors do about their threaded Needles which they ſtick on their Sleeves. This Suture is alſo performed Two Ways; either Needles are run acroſs the Wound, as that marked *N.* or as that which is pointed at by *O.* They are fixed on its Sides. Both of them are commonly performed with Two Needles: For the Firſt, the Operator takes Two ſtraight ſharp-pointed Needles, which one after the other, with the Help of the Pipe, he runs acroſs the Wound. He begins to enter them on the Outſide of the Wound inwards, and draws them out from the Inſide outwards, and finding them ſo diſpoſed as that their Extremities make a regular Square, he takes a Thread, which he winds about their four Ends, and croſs over the Wound three or four times in ſuch a Manner, as he cauſes the Lip to cloſe exactly; after which, faſtening the Thread, he cuts off the Points of the Needles with an inciſive *Forceps*, and finiſhes with Two Bolſters *P. P.* which are put under the Needles. The Second Sort of *Tortile Suture* differs from the former only, in that the Needles, inſtead of croſſing the Wound, are run along its Lips.

The *Dry Suture* is ſo called, becauſe it does not require any Effuſion of Blood, nor does it want either Needle, Thread, or Pipe. 'Tis applied without Pain, and alſo, like the former, diſtinguiſhed into Two ſeveral Sorts, becauſe ſometimes performed with a ſingle Piece of Stuff, and at others with Two. To perform the Firſt, the Operator takes a ſmall Bit of Cloth or Leather, ſhap'd like thoſe mark'd *Q.* which he covers with ſtrong Glue, or ſome viſcous Ingredient, which ſticks it faſt to the Skin, as, Meal intermixed with the White of an Egg: He applies one Moiety of it on one Side of the Wound, and when fix'd on the Skin, he draws the Cloth on the remaining Part, in order to apply it on the other Side, where it ſticking very faſt, by that Means cloſes the Lips of the Wound. The *Suture* is very eaſily performed, but is ſolely proper to be applied to ſuperficial Wounds. The other Kind of *Dry Suture* is not ſo lightly performed. The Surgeon takes Two ſmall Bits of Leather, *R. R.* cut in a triangular Form, on one Side of which are Three Indentures, to each of which is faſten'd a ſmall Thread: Theſe Leathers are ſpread with ſome Ingredient which ſticks them faſt to the Skin, and the Surgeon lays one of them on each the Lips of the Wound, and the other on the other, taking Care that the Two Places on which they are laid, be about a Finger's Breadth diſtant from the Extremities of the Edges of the Wound, as is expreſſed by *R.* after which, by drawing the Ends of the Thread, he cauſes the Lips of the Wound to cloſe, and tying the Thread together by a double Knot, keeps them joined, ſo that tht Reunion may eaſily be accompliſhed. Some ſew the Indentures to one another, or fix Buckles on them, in order to paſs through a ſmall String; and others only make Use of Two ſmall Bits of Leather marked *S.* ſpread over with the ſame Remedy, and provided with the ſame Threads, Tapes, or Ribbands; but this does not alter the Species, and ſerves only to the ſame End. This *Suture* is very effectual in Wounds of the Face, by reaſon that avoiding the deforming Marks occaſioned by the Points of the Needle, the Remains of them are very little ſeen after their Cure.

I do not mention figured and angular Wounds, becauſe their Differences may be ſo numerous, that 'tis impoſſible here to ſhew you how to ſew them all. I ſhall only hint to you in general, that we always begin the Stitches of the *Interſected Suture* in the Angles when there are any, and in the Middle of their right or circular Lines when there are none. We make as many Stitches as the Length of the Wound requires, ſerving not to make them too cloſe, nor too far from each other, but at ſuch a reaſonable Diſtance from one another as the Danger of the Wound's ſeparating again may ſtand in need of, cloſing firſt, and with the ſtrongeſt Force, that Place which is moſt violently inclined to dilate, by reaſon that keeping that firmly cloſed, all the others will of themſelves remain in the Situation in which they are placed.

Apparatus for the Eye-lids, Fig. 3. Of Dion.

OF the Six Operations to be performed on the Eye-lids, the Firſt is the *Ancyloblepharon*,

on, which Word is deriv'd from *Ancyli*, which ignifies a Hook, and *Blepharon* an Eye-lid. 'Tis termed in *Latin Inviſcatio*, and in *Engſh Agglutination*, and is a Diſtemper in which the Eye-lids are ſtuck and glued together, which hinders the opening of the Eye. This Accident may come into the World with a Perſon, ſince we ſee Children born with other Orifices ſtop'd; but it moſt frequently happens after a Fluxion, and the Small-Pox: When the Patient has long continued without opening his Eyes, the ulcerated Eye-lids agglutinate and cicatrize together. Every Body knows that the Eye-lids muſt be ſeparated, but it is the Surgeon's Task to diſcover the Means to attain that End. If the Agglutination is imperfect, and there remains yet a ſmall Aperture at one of the Corners, with the Inſtrument *A.* ſhap'd like a crooked Inciſion Knife, provided with a Button at its Point, introduced into the mentioned Orifice, he at ſeveral times cuts under theſe conglutinated Parts, with drawing that Inſtrument, in order ſucceſſively to divide the Two Eye-lids from one Corner to the other. If after this Separation either of them be joined to either the *Aduata* or *Cornea*, he is to ſeparate them, All which is done, the Operation cannot be ſaid to be finiſhed. The Surgeon acquits himſelf in this Caſe by drawing the Eye-lid towards him with the ſmall Inſtrument *B.* ſhaped like a *Spatula*, endeavouring to looſen the Eye-lid from the Body of the Eye: But if it ſticks too faſt, he cuts with the Penknife *C.* what made the Agglutination, being very careful that he does not cut either the *Tunica, Cornea*, or the *Aduata*, but rather cutting the internal Membrane of the Eye-lid. Next we thruſt between the Eye-lid and the Eye the Two ſmall thin Bits of Lint *D. D.* dipped in ſome deſiccative Liquor to prevent their joining again, which Practice is to be continued till the Cure is perfectly performed.

The Second is the *Lagopthalmos*, derived from *Lagos* a Hare, and *Opthalmos* an Eye, which ſignifies Hare's Eye. 'Tis a Diſtemper in which the upper Eye-lid is ſo drawn back, that being too much contracted to be able to cover the Eye, it is forced to remain open whilſt the Patient ſleeps, as do the Eyes of Hares. This Diſtemper is cured by Pharmacy, that is, by the external Application of Remedies to the Part, mollifying or relaxing whatever keeps it out of its ſteady Courſe, or ſtrengthning it, according as the Diſeaſe is, whether Convulſive or Paralitick: But if theſe Remedies prove unſucceſsful, and the Eye-lid be contracted by a Cicatrize, we have Recourſe to the manual Part of Surgery, which we begin with placing the Patient in ſuch a Poſture as expoſes the Part to the Light: The ſound or well Eye is covered with the Band *E.* and the Eye affected we ſubject to our Direction by the *Speculum Oculi F.* if practicable, or elſe hold it betwixt the Thumb and Forefinger of the Left Hand, keeping the Eye-lid very much drawn downwards; then with the Inciſion Knife *G.* we make on that Eye-lid an Inciſion in the Form of a Creſcent, according to the Direction of the Fibres of the *Occluſory Muſcle*, the Points of the ſaid Creſcent turning downwards, and approaching the Corners of the Eye. This Inciſion made, we ſeparate the Lips of the Orifice as wide as poſſible, and provide them with Pledgets ſhaped like Olive Stones; and contrary to all other Wounds, whoſe Lips we endeavour to draw together, in order to procure their cicatrizing, in this Caſe we ſeparate them in order to cure them.

The Third is *Ectropion*, derived from *Ec* and *Steptin*, to turn outwards, and is a Relaxation or Falling down of the under Eye-lid, that it cannot poſſibly cover the Eye. Authors aſſign Three ſeveral Cauſes of this Indiſpoſition. The Firſt is the Palſis, or Relaxation, as well of the Eye-lid as the Occluſory Muſcle. The Second conſiſts in a ſuperfluous Fleſh which inſenſibly grows on the Inſide of the Eye-lid: And the Third may be ſome *Burning*, *Scar* or *Cut* on the *Outſide*. The Method of Cure differs according to the Diverſity of the Cauſe. If the Eye lid is relaxed, the Surgeon is to apply Deſiccatives; if too feeble, Corroboratives; if a carnous Excreſcence, it muſt be taken off whilſt young and ſmall, and we may conſume it by Cauſticks; but if old and hard, we eradicate it either by Ligature, if its Baſis be very ſmall, with the Thread *H.* paſſed through the crooked Needle *I.* which is to be run through the Excreſcence to prevent the ſlipping of the Ligature; or by Inciſion,

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Apparatus for the Eye-lids, Fig. *Of* Dion.

OF the Six Operations to be performed the Eye-lids, the Firſt is the *Ancyl*

…on, which Word is deriv'd from *Ancyli*, which …gnifies a Hook, and *Blepharon* an Eye-lid. …is termed in *Latin Inviſcatio*, and in *Eng-…ſh Agglutination*, and is a Diſtemper in …which the Eye-lids are ſtuck and glued to-…ether, which hinders the opening of the …ye. This Accident may come into the …World with a Perſon, ſince we ſee Children …born with other Orifices ſtop'd; but it moſt …requently happens after a Fluxion, and the …mall-Pox: When the Patient has long con-…inued without opening his Eyes, the ulce-…ated Eye-lids agglutinate and cicatrize toge-…ther. Every Body knows that the Eye-lids …muſt be ſeparated, but it is the Surgeon's …ask to diſcover the Means to attain that …End. If the Agglutination is imperfect, and …here remains yet a ſmall Aperture at one of …he Corners, with the Inſtrument *A.* ſhap'd …ike a crooked Inciſion Knife, provided with …Button at its Point, introduced into the …nentioned Orifice, he at ſeveral times cuts …under theſe conglutinated Parts, with …rawing that Inſtrument, in order ſucceſ-…ively to divide the Two Eye-lids from one …Corner to the other. If after this Separa-…on either of them be joined to either the …*Aduata* or *Cornea*, he is to ſeparate them, …ll which is done, the Operation cannot be …id to be finiſhed. The Surgeon acquits …imſelf in this Caſe by drawing the Eye-lid …owards him with the ſmall Inſtrument *B.* …haped like a *Spatula*, endeavouring to looſen …he Eye-lid from the Body of the Eye: But …it ſticks too faſt, he cuts with the Pen-…nife *C.* what made the Agglutination, being …ry careful that he does not cut either the …*unica*, *Cornea*, or the *Aduata*, but rather …tting the internal Membrane of the Eye-…d. Next we thruſt between the Eye-lid …d the Eye the Two ſmall thin Bits of Li-…n *D. D.* dipped in ſome deſiccative Li-…or to prevent their joining again, which …actice is to be continued till the Cure is …rfectly performed.

The Second is the *Lagopthalmos*, derived …om *Lagos* a Hare, and *Opthalmos* an Eye, …hich ſignifies Hare's Eye. 'Tis a Diſtem-…, in which the upper Eye-lid is ſo drawn …ck, that being too much contracted to be …e to cover the Eye, it is forced to remain …n whilſt the Patient ſleeps, as do the …es of Hares. This Diſtemper is cured by Pharmacy, that is, by the external Application of Remedies to the Part, mollifying or relaxing whatever keeps it out of its ſteady Courſe, or ſtrengthning it, according as the Diſeaſe is, whether Convulſive or Paralitick: But if theſe Remedies prove unſucceſsful, and the Eye-lid be contracted by a Cicatrize, we have Recourſe to the manual Part of Surgery, which we begin with placing the Patient in ſuch a Poſture as expoſes the Part to the Light: The ſound or well Eye is covered with the Band *E.* and the Eye affected we ſubject to our Direction by the *Speculum Oculi F.* if practicable, or elſe hold it betwixt the Thumb and Forefinger of the Left Hand, keeping the Eye-lid very much drawn downwards; then with the Inciſion Knife *G.* we make on that Eye-lid an Inciſion in the Form of a Creſcent, according to the Direction of the Fibres of the *Occluſory Muſcle*, the Points of the ſaid Creſcent turning downwards, and approaching the Corners of the Eye. This Inciſion made, we ſeparate the Lips of the Orifice as wide as poſſible, and provide them with Pledgets ſhaped like Olive Stones; and contrary to all other Wounds, whoſe Lips we endeavour to draw together, in order to procure their cicatrizing, in this Caſe we ſeparate them in order to cure them.

The Third is *Ectropion*, derived from *Ec* and *Steptin*, to turn outwards, and is a Relaxation or Falling down of the under Eye-lid, that it cannot poſſibly cover the Eye. Authors aſſign Three ſeveral Cauſes of this Indiſpoſition. The Firſt is the Palſis, or Relaxation, as well of the Eye-lid as the Occluſory Muſcle. The Second conſiſts in a ſuperfluous Fleſh which inſenſibly grows on the Inſide of the Eye-lid: And the Third may be ſome *Burning*, *Scar* or *Cut* on the *Outſide*. The Method of Cure differs according to the Diverſity of the Cauſe. If the Eye lid is relaxed, the Surgeon is to apply Deſiccatives; if too feeble, Corroboratives; if a carnous Excreſcence, it muſt be taken off whilſt young and ſmall, and we may conſume it by Cauſticks; but if old and hard, we eradicate it either by Ligature, if its Baſis be very ſmall, with the Thread *H.* paſſed through the crooked Needle *I.* which is to be run through the Excreſcence to prevent the ſlipping of the Ligature; or by Inciſion,

ciſion, if it cannot be done otherwiſe, after which we apply Colliries, or aſtringent Powders, to cicatrize the cut Places. Thirdly, if a Burn or Scar draws down and detains the Eye-lid, we make an Inciſion on it with the Inciſion Knife *G.* of the Figure of a Creſcent.

The Fourth is the *Crithe*, which Word is derived from *Crite*, a Barley-Corn. 'Tis a narrow, longiſh, fix'd and ſettled Tumour, ſhap'd like a Barley-Corn, which grows on the Edges of the Eye-lids amongſt the Hairs. The Matter which ſupplies theſe ſmall Tumours is contained in a little Bladder, and does not without Difficulty ripen and ſuppurate. We are to bring it to Suppuration, to which End the Pap of roaſted Apples, applied by way of Pultiſe, is excellent; and when we find it ripe, and the Matter digeſted, with the Point of the Lancet *K.* we make a ſmall Orifice according to the Length of the Tumour, then betwixt our Two Nails ſqueeze out the *Pus* and the Bladder together, which done, it heals of it ſelf, without the Application of any Remedy.

The Fifth is the *Perioſis*, or *Lithiaſis*, or the *Hailſtone*, which is a ſmall Puſh, Pimple, or Tubercle, that comes upon either Eye-lid, and is moveable, ſo that when preſſed, it changes its Place, in which Particular it differs from the former, that is always fixed. For the Cure we cannot attend the Suppuration, nothing being able to do it but the Operation, which is made by a longitudinal Inciſion on the Calloſity with the Lancet *K.* then with the Crotchet lay hold of it, and ſeparate it with the Inſtrument *M.* ſhap'd like a Myrtle-leav'd Knife, without taking away any of the Membrane of the Eye-lid; over theſe ſmall Orifices we lay the ſticking Plaiſter *N.* to cloſe the Apertures, then a Bolſter, and on that the Band *E.* which ſecures the whole *Apparatus.*

The Sixth is the *Hydates*, which comes from *Hydor* Water. It is a Tumour form'd on the upper Eye-lid in a particular Bladder. This Tumour appears more when the Eye is ſhut than when open. 'Tis round and flat, and very near of the ſame Nature with that Sort of cancerous Tumour we call the *Wolf*; and proceeding from the ſame Cauſe, we ought to hunt after no other, theſe being cured the ſame Way as they are. The Salve *Diabrotanum*, with which *Wolves* are diſſolved, is a Sovereign Remedy in caſes of the *Hydatis*; but if the Matter, inſtead of diſſolving, grows harder, and the Tumour increaſes, we muſt then proceed to Operation, which conſiſts in taking it out with the Bladder, as though it was a Wolf. We keep the Eye-lid ſhut, either with the *Speculum Oculi F.* or with the Fingers, and make an Inciſion on the Skin with the Knife *C.* according to the Straightneſs of the Fibres, being very careful to avoid the opening of the *Involucrum* or Purſe which contains the Matter, that the drawing it out all at once may not thereby be prevented, that being otherwiſe eaſily done; for the Tumour being uncovered, if never ſo little preſſed on the Sides, turns outwards, and with a Worm we force it out whole.

Of the Eye-laſhes, or hairy Edges of the Eye-lids, Fig. 34. *Of* Dion.

UNder the Name of *Trichiaſis*, which comes from *Trix* a Hair, are underſtood the Diſeaſes of the Eye-laſhes, and the Operations to be performed on them, which are of Three Sorts. The Firſt is the *Diſtichiaſis*, derived from Two Orders, and is a Diſeaſe of the Eye-lids, in which, under the ordinary Eye laſhes, there grows another extraordinary Row of Hair, which frequently eradicates the former, and pricking the Membrane of the Eye, excites Pain, and draws on a Fluxion. To remedy this Inconvenience, no other Operation is neceſſary than the pulling out the ſupernumerary Hairs with the ſmall Pincers *A.* not unlike thoſe uſed to pluck Hairs out of the Beard, and the whole Secret conſiſts in the preventing their Return; the moſt certain Way of doing which is, after pulling out the Hairs, to cauterize with a hot Needle *B.* the Place where they were plucked out, and continue on, till we have ſeared all the Pores from whence the Hairs grew. This Operation requires as great a Share of Addreſs in the Surgeon, as Patience in the Patient.

The Second is the *Phalangoſis*, from *Phalanx*, which among the *Romans* was taken for a Rank of Soldiers, becauſe in this Caſe the Hairs are erected and pointed toward

the Eye, as the Arms of a Company of Soldiers are againſt the Enemy. It proceeds from Two Cauſes, which are, either the exceſſive Relaxation of the Skin of the upper Eye-lid, or the Contraction of the Membrane of the ſame Eye-lid, which drawing inwards, its cartilaginous Extremity forces the Hair to turn their Points againſt the Eye, inſtead of inclining them outwards. The Surgeon is to examine which of the Two Membranes occaſions it: If he finds the external one to be relaxed, he applies ſuch Remedies as will dry and ſtrengthen it, and in the mean while, as in caſe of *Dry Sutures*, he here fixes Two little Bits of Leather *C. D.* charged with an Emplaſtick Unguent, one on the Eye-lid, and the other on the Forehead above the Eye-brows, and by Means of the ſmall Threads *E. E. E.* faſtened to theſe Plaiſters, he ties them together, ſo that being drawn moderately cloſe, they keep the Eye-lid in its natural Poſture. If the Fault be in the internal Membrane being too much drawn inwards, after we have with one Hand turned the Eye-lid outwards, we are with the Knife *F.* to make a ſmall Inciſion longways, in order to unbridle it, and give it Leave to extend it ſelf; by which Means the Eye-laſhes will reaſſume their natural Poſition, and the Eye be no longer incommoded by them.

The Third is *Ptoſis*, or a Falling down of the Eye-laſhes into the Eyes. 'Tis a turning inwards of the upper Eye-lid in ſuch a Manner, that the *Tarſus*, where the Hairs are planted, being bent inwards, they enter the Eye, and very much fatigue it. The Ancients propoſe to us an Operation which few People will approve: 'Tis to make on the upper Eye-lid Two Inciſions in Form of a Creſcent, whoſe Points join together, theſe Inciſions being diſtant from one another as far as the Operator believes the Eye-lid to be relaxed, to flay off the Skin betwixt them, then to ſew up the Wound, but not cloſe it farther than is neceſſary to enable the Part to cover the Eye. This Operation, which of it ſelf is tedious and cruel, ever after it is over, is expoſed to Two great Inconveniencies: One of which is, that if we have not taken off enough of the Skin, our Labour proves vain; and the other, if too much, the Eye cannot cover it ſelf: Wherefore I adviſe the abandoning this Operation and to make Uſe of the *Dry Suture*, which I have juſt ſhew'd you, and aſtringent and comfortable Medicines, in which we are to dip the Plaiſter *G.* and the larger one *H.* upon it, which we bind to the Eye by the Band *I.* which faſtens the whole *Apparatus*.

Of the Tunicles of the Eyes, Fig. 35. *Of* Dion.

THere are Four Operations practiſed on the Tunicles of the Eye, in relation to Four Indiſpoſitions with which they are afflicted. The Firſt is the *Hypopyon*, which is a Collection or Gathering of *Pus* behind the *Cornea*, that ordinarily proceeds from an Effuſion of Blood, occaſioned either by the Plenitude of the Veſſels, or ſome Blow or Fall. Before this Blood is turned into Matter, it cauſes very ſenſible and ſharp ſhooting Pains; and when it is become *Pus*, which we diſcern by the Whiteneſs which appears acroſs the *Cornea*, the Surgeon is to force it out, if he will put an End to the Patient's Pains. Some of the Ancients diſtinguiſh this Diſtemper into Two Species, calling the Firſt *Onyx*, which ſignifies a Nail, becauſe the collected *Pus* under the *Cornea* repreſents the Figure of a Finger Nail, leaving the general Name of *Hypopyon* to the Second Species, which produces it ſelf when the purulent Matter is in greater Quantity, and takes up half of the Black of the Eye. In order to its Cure, we are to try to diſſipate the Matter under the *Cornea*, if its Quantity be but ſmall, to that End making Uſe of Fomentations, and reſolving Colliries, made of Fenegreek and Fennel; after which we proceed to the Operation, in which we are to make an Orifice in the *Cornea* with the Lancet *A.* which we inſinuate at the loweſt Place, in order to give the *Pus* the more commodious Vent. We are not to be ſurpris'd when we ſee the aqueous Humour run out with the *Pus* at the Inciſion, that Humour eaſily repairing it ſelf, but the Scar which grows on the *Cornea*, frequently proves an Impediment to the Sight. After the Aperture, we make Uſe of Repercuſſive and Anodine Remedies, and at the End of the Cure ap-

ply Colliries, deterſive and deſiccative Powders.

The Second is the *Pterygion*, which ſignifies a Wing, becauſe this Diſeaſe aſſumes the Shape of an extended Wing. 'Tis call'd in *Latin Unguis* from its being of the Colour of a Man's Nail. 'Tis a membranous Excreſcence in the Eye, which for the moſt part riſes originally at the great Corner of that Part, and rarely at the leſs, ſpreading on the conjunctive Tunicle, and ſometimes as far as the *Cornea*, where it covers the Eye, and darkens the Sight.

There are Three Species of this Indiſpoſition. The Firſt is the membranous, of which we have juſt been ſpeaking; the Second the adipous, from the Reſemblance it bears to Fat; the Third is called *Panniculus*, by reaſon it looks like a Bit of Linen, and is the moſt malignant of all the Three, being intermixed with large red Veſſels, which inflame and ulcerate it, and renders the Cure more difficult. All theſe Species are not always adherent to the conjunctive Tunicle in all their Parts, but only at their Ends; wherefore there is ſometimes Diſtance enough left to paſs a bent blunt Needle betwixt the Conjunctive and the *Pterygion*. There are but Two Ways of curing it, which are, the conſuming it with the Powders of Verdigreaſe, Vitriol, or Burnt Allum, when it is young and ſmall, and to eradicate it when large and hard, the laſt of which Methods is not always practicable; for in great and inverted *Pterygions*, which are cancerous, the Pain whereof proceeds as far as the Temples, they are not to be touched. When the Surgeon undertakes the Extirpation, after having prepared his Patient by general Remedies, and placed him commodiouſly, he is to cauſe one of his Servants to turn outwards one of his Eye-lids, and doing the ſame by the other himſelf, he is then to paſs the curved blunt Needle *B.* threaded with the Thread *C.* under the *Pterygion*, and with the Two Ends of the ſaid Thread raiſe up and draw it towards him, in order to ſeparate it from its Adherences with the ſmall Inciſion Knife *D.* carefully avoiding the Wounding of the *Cornea*, rather leaving a ſmall Part of the *Pterygion* to waſt away afterwards, which the Surgeon is afterwards to work on. The reſt of the Cure is performed by Colliries and deſiccative Powders. The Patient is to be dreſſed three or four times a Day, obliging him to open his Eye every Time, that the Lids may not ſtick to the Conjunctive Tunicle.

The Third is the *Proptoſis*, which ſignifies to fall forward. This Term, which is convertible to all Parts of the Body that ſtart out of their Place, is here particularly applied to the Eye when it puſhes or ſets out, or proceeds beyond its Orbit, by reaſon of the Relaxation or Rupture of the *Cornea*. The Tumour which is produced by the *Uvea*, takes ſeveral Names, according to its Size, and the Things which it reſembles. Authors divide them into Four Species. The Firſt, in which the Tumour is ſmalleſt, is called the *Myocephalon*, becauſe ſhaped like a Fly; the Second *Staphyloma*, in Size and Figure reſembling a Grape-ſtone; the Third is call'd *Melon*, becauſe that the *Uvea* coming out in greater Quantity, produces a larger Tumour, in Figure and Bulk like an Apple; the Fourth is called *Ilos*, that is a Nail, and happens when the *Uvea* being driven out of the Eye-lids, grows hard, and the *Cornea* becoming *callous*, preſſes it, ſo that it reſembles the Head of a Nail. Theſe Indiſpoſitions bring with them Two Inconveniencies; one of which is the Loſs of the Sight, and the other the Deformity of the Face: The Firſt of which is not to be remedied, but the Second may be helped Two Ways; that is, either by Medicaments or Operation. If the *Staphyloma* be recent, and cauſed by an Inflammation which raiſes or ſwells the *Cornea*, we are to endeavour to digeſt and reſolve the Matter by Remedies compoſed of Mucilages, prepared from the Seeds of Lime and Fenegreek, with a little Honey; but if it will not diſſolve, we are to give it Vent by Operation, that is, by the Point of the Lancet *A.* But if the *Staphyloma* be not malignant, and its *Baſis* be ſmall, it may be better extirpated by Ligature, which is perform'd Two Ways: To which End the Patient's Head being placed on the Surgeon's Knees, he being ſitting, that Operator makes the ſlipping Knot *E.* of the Forceps *F.* of which he ſlides it on the Tumour, which he binds, and daily makes tight by drawing the Knot cloſer, till it falls off; or elſe he runs the Needle *G.* threaded with Two Threads

Threads *H. I.* of ſeveral Colours, through the Middle of the Root of the Tumour, extending it from the great Corner of the Eye to the leſſer, the Thread being paſs'd thro', he removes the Needle, and taking the Two Ends of the ſame Colour, he ties them together on one Side, and does the ſame by the other Thread on the other Side, and drawing them cloſer daily, theſe Threads will by little and little cut the Tumour. In order to make theſe Ligatures, the Surgeon makes Uſe of the *Speculum Oculi K.* to hold the Eye firm during the Operation, which performed, we apply the proper Remedies to aſſwage the Pain, carefully avoiding, during the Dreſſing, the Drawing of the Threads, which frequently ſtick to, and dry with the Remedies. When they fall off themſelves, we make Uſe of the little Plaiſter *L.* and cleanſing the Ulcer, conſolidate and heal it as much as is poſſible in ſuch nice and difficult Caſes as the Diſtempers of the *Cornea.*

The Fourth Diſeaſe is the *Hypochyma*, becauſe this Diſeaſe ſeems to be a Humour diſſolv'd in the Eye. 'Tis otherwiſe call'd a *Cataract*, from the Reſemblance this Humour under the *Cornea* bears to Horn, and in *Latin* is term'd *Suffuſio.* This is an exotick Matter, which imperceptibly gathering and condenſing, becomes like a thin Membrane or Skin betwixt the *Cornea* and the *Criſtalline* in the aqueous Humour, before the Orifice of the *Uvea*, hindring the luminary Rays of the Objects ſticking on the *Criſtalline.* We conſider this Indiſpoſition in Three ſeveral Periods, *viz.* In its Beginning, when the Patient believes he diſcerns before his Eyes Flies, or unnatural groteſque Figures, when it is call'd *Imaginatio:* Secondly, in its middle State, when it forms it ſelf, condenſes, and very much diminiſhes the Sight, when 'tis call'd a *Suffuſion:* Thirdly, when 'tis perfectly formed, and has wholly eclips'd the Sight, and is call'd in general by the Name of a *Cataract.*

This is cured Two Ways, by ordinary Remedies, or by Surgery. The former may ſucceed at the Beginning; but when this Diſeaſe is confirm'd, nothing but manual Operation can compaſs that End. When it begins, we may hinder its Encreaſe by a ſober drying Regimen of Living, by Bleedings and Purgings, by the Applications of Cupping-Glaſſes, Bliſters, Cauſticks, or Setons, and by the Uſe of Maſticatories, or Carminative and Digeſtive Powders. The Conjunctive Matter, that is what begins to appear in the Eye in the Form of a Miſt, is commonly diſſipated by Colliries, attenuating, inciſive, and diſſolvent Powders. *Fabricius Hildanus* invented a little Glaſs Viol to hold a Liquor on the Eye; its Figure is oval, to adjuſt it to that Part, and it has a Paſſage at the Top, through which, when applied to the Eye, the Liquor with which we would bath the Part is poured, and Two Strings to tie it behind the Head, in order to keep it faſt to the Eye. He pretended by this Method to diſſolve the Humours which might have ſoak'd into the Membrane, and diſſipate a *Cataract* at its Beginning. You have the Figure of it repreſented at the Letter *Z.*

After having made Choice of your Seaſon of the Year, the Day and Place proper for the Operation, as directed in *Maitre-Jan's* Treatiſe of the Eyes, as ſoon as the Operator has order'd the Patient to turn the Eye towards his Noſe, he plunges his Needle into the Body of the Eye on the Side towards the ſmall Corner, and thruſts that Inſtrument forwards, inclining the Handle to the Temple, till he perceives it has croſs'd the *Cornea*, and reach'd the Middle of the *Cataract*, which he ſeizes at the upper Part with the Point of the Needle, and couches or thruſts down below the Ball of the Eye, where he holds it down during a ſmall Space of Time, which, if it ſtay there, the Operation is finiſh'd; but if it flies up again as ſoon as let looſe, it muſt be again thruſt down with the ſame Needle, and preſs'd yet harder to prevent its riſing any more. If after all our Precaution in order to diſcover the Nature of the Cataract, it prove milky, and as ſoon as we have touch'd it, it opens and divides, not being able to bear the Needle which runs through it, as though it were Milk Curds, by turning the Inſtrument from one Side to the other, the Surgeon is to cleave it into ſo many ſmall Particles, that it may ſeparate it ſelf, carefully avoiding the touching of the Membrane of the *Uvea*, which is full of ſmall Veins, ſo that it will be difficult to eſcape

the opening of ſome one of them, which will occaſion the Effuſion of ſome Drops of Blood, which will cauſe a *Hypopyon*. If the *Cataract* be of a direct contrary Nature, and is ſo hard that the Needle at the Touch of it makes a Noiſe as though it grated againſt Parchment, and the Fibres ſo ſtrong that it rebounds, we are then to raiſe it up with the Needle by the lower Part of it, which regards the under Eye-lid, and rolling it about the Needle with a Spring, turn it upſide down all at once. The Operation being finiſh'd, we withdraw the Needle, and uſually ſhow the Patient Two Glaſſes, in one of which is Red Wine, and the other Water, and if he can diſtinguiſh the Colours, we are ſure the Operation is well perform'd. Some Phyſicians deny this Evidence, but it is the practical one.

After the Operation, we lay on the Eye a defenſative Plaiſter *Q*: compoſed of Whites of Eggs, Plantane, Roſe and Nightſhade Waters, laying withal on the Temple the aſtringent Plaiſter *R*. to prevent Fluxion: We apply the Two Bolſters *S. T.* dip'd in refreſhing Waters, one to the Eye, and the other to the Temple, and over them a Bandage which covers both Eyes. We immediately put the Patient to Bed, where he muſt lie on his Back for ſome Days, with his Head rais'd indifferently high: We bleed him in the Evening, and keep his Belly open. He muſt neither ſpeak nor take any ſolid Nouriſhment, for fear the Chewing ſhould either occaſion the raiſing of the Cataract, or the Falling of a Flux on the Eye. We are not to make him open his Eye till Three Days afterwards, though we are obliged to change the Remedies often, leſt drying, they might hurt that Organ by their Hardneſs: Whilſt we are changing them, the Light is to be plac'd behind the Patient's Head, that he may not be incommoded by the *Cataract*, and the Dreſſing is to be perform'd without moving his Head. To conclude, he muſt keep himſelf very ſtill, and the Light out of his Chamber, before the Symptoms are paſs'd over.

We muſt not forget an Operation which offers every Day. 'Tis the Extraction of exotick Bodies that have enter'd the Eye. The Surgeon is frequently applied to, when the Patient has had all done to him that can be, by rubbing and blowing into the Eye, the Pain that he feels forcing him to deſire ſpeedy Help; to give which, we turn out one or other of the Eye-lids, and endeavour to diſcover the exotick Body, in order to force it out with the ſmall Inſtrument *X*. If we cannot ſee it, we are to make a ſmall Bath for the Eye, obliging the Patient to lie down, and pour into the great Corner a little warm Water, which coming out, after having waſh'd the Ball of the Eye, may draw along with it the Dirt or ſmall Spark which occaſion'd the Pain; and if we cannot get it out this Way, we faſten to a Sprig of Birch a ſmall Bit of very fine Spunge *Y*, and ſweep with it all the fore Part of the Body of the Eye, in order with the Spunge ſecurely to bring away whatever was got under the Eye-lids; which done, the Patient will inſtantly be at Eaſe, and then we make Uſe of Colliries, and refreſhing Waters, to prevent the Inflammation which may follow.

For the Corners of the Eyes, Fig. 36. *From* Dion.

OF the Three Operations which the Surgeon performs on the Corners of the Eyes, the Firſt is the *Eccanthis*, to expreſs that the Diſeaſe which anſwers to it, is a fleſhy Excreſcence which comes in the great Angle of the Eye. There are Two Sorts of it, the one indolent, reddiſh, tender and gentle, eaſily ſubmitting to common Remedies; and the other, which is painful, Lead-coloured, malignant, and obſtinately reſiſting all Remedies, is only cured by Operation. Authors aſſign Three principal Cauſes of this Diſeaſe: Firſt, a melancholick Humour, which encreaſes and hardens the Subſtance of the Fleſh of the above-mention'd Place, and renders it as it were watery: Secondly, an *Hyperſarcoſis*, a Superfluity or Overgrowth of Fleſh: Thirdly, a Remainder of the *Pterygion*, which being neither cut nor conſum'd, grows and hardens in that Manner.

In order to the Cure of the Firſt Species of *Eccanthis*, we are to conſume the Excreſcence with Burnt Allum, Calcin'd Vitriol, greaſe, Red Mercury, or Spirit of Vitriol.

ut the Second, which is hard, intractable
d malignant, muſt be removed by Inci-
on: To perform which, with the Needle
we run the Thread *B.* through acroſs the
eſh, in order to raiſe it, and by that Means
cut it with the Knife *C.* cloſe to the Glan-
ule, carefully avoiding the Touching of
e Lacrymal Duct, which goes into the
oſtril; for if it ſtop in cicatrizing, the
mpha, which inceſſantly moiſtens the Eye,
d becomes the Cauſe of Tears, when preſ-
d much in its Filtration near or about
eſe Organs, not being able any longer to
ntinue in its former Courſe, runs down
e Cheeks, and occaſions a continual Weep-
g or Flux of Tears.

The Second is the *Anchylops*, or *Abſceſſus
ularis*; that is, a Tumour, or an Abſceſs
t yet open, ſituate betwixt the great Cor-
of the Eye and the Noſe, and form'd
n a thick glutinous Humour, almoſt
that contain'd in that Kind of Cancers
call Wolves, which augments and ripens
ſlow Degrees, and with an eaſy and light
n. To cure it, ſuppoſing general Reme-
s firſt made Uſe of, we apply to the Tu-
ur at firſt Deſiccatives and Aſtringents,
ſuppreſs, conſume and dry up the Hu-
ur gathered in that Part. If the Tu-
ur continues, and by its ſupervening
lneſs and Inflammation convinces us that
ends to Suppuration, we are to open it
h the Lancet *D.* and we believe that the
tter is incloſed in a *Cyſtis* or Bladder:
are to ſeparate it, or conſume it with
ches of *White Lead*, or precipitate Mer-
y, in order to cleanſe and cicatrize the
und. We are to take Notice, that as ſoon
ie Tumour is open, it changes its Name of
ylops for that of *Ægilops*, which ex-
es the Indiſpoſition I am going to treat
which Term ſignifies a Goat's Eye, from
Eyes of that Animal being very ſubject
his Diſtemper, which is what we call a
ymal Fiſtula, and is a ſmall callous, but
Ulcer in the great Corner of the Eye,
e Place of the Situation of the *Lacrymal
dule*, which is nothing but a fat fleſhy
e, interſperſed with ſeveral almoſt im-
ptible Glandules. This Ulcer always
ns with a ſmall Abſceſs in that Place,
e the Matter which putrefies, ſoon taints
Bone, by reaſon there is but a ſmall
Space betwixt it and the Skin, and being more ſpungy than other Bones, it rots ſooner.

Of theſe *Fiſtula's* ſome are open within, and the other without. The Firſt proceed from a ſluggiſh Humour, on which the Outſide forms but a ſmall Tumour no bigger than a Pea, which being preſſed by the Finger, caſts into the Eye, I would ſay, betwixt the Eye-lids, a ſerous, and ſometimes viſcous and white Sanies. The other are produced from an active and hot Matter, which in corrupting growing ſharp, eats the Bone, which is thin and porous, and at the ſame Time ſufficiently makes its Way out to run continually, till we dry up its Source. When they are old, they waſt and leſſen the Eye. The Cavities commonly corrode and penetrate as far as the Bones of the Noſe, which renders the Breath ſtrong and ſtinking, and the Cure very difficult; but when the *Fiſtula* is recent, and its Orifice diſtant from the Ball of the Eye, it affords Hope of Succeſs in Cure, either by Remedies or Operation.

In both Ways of curing theſe *Lacrymal Fiſtula's*, we are to prepare the Bodies by a regular Way of Living, Bleedings, Purgings, *&c.* If we would make Uſe of the gentleſt Way, which is that of Medicaments, we are to take different Methods with that which is only open withinſide, from thoſe to be obſerved with that which is open without.

When there is but a ſmall Eminence without, and preſſing it, we find that the Matter which forms it runs into the Eye, we have Reaſon to believe that Matter to be kind and gentle, and that it is not acrimonious enough to force the Skin, and make it ſelf an Iſſue out that Way; and when it cannot pierce the Skin, we have alſo Reaſon to believe that it has not been able to eat into the *Perioſteum*, and that the Bone is not uncover'd, it being probable that this Matter may have gathered in a little Purſe betwixt the Skin and the *Pericranium*, without occaſioning any Indiſpoſition attended with very pernicious Conſequences. In this Caſe, all that is neceſſary to the Cure, is for the Surgeon to hinder the gathering of the Matter in that Vacuity, which has been ſucceſsfully done by ſimple Compreſſion, by which

I have

I have cured ſeveral, eſpecially Children: I lay a little Plaiſter of Burnt *Ceruſe* on the Tumour, and over that with a ſmall triangular Bolſter, of the Thickneſs of half an Inch, to fill up the Corner of the Eye, and over that another of the ſame Shape and Thickneſs, but ſomewhat larger, having dipped them both in a deſiccative Water, when I cover all with a narrow circular Band, which tightening the Bolſters on the little Bag, prevents the Humour gathering any more, and glues in the Vacuity, provided this Courſe be continued ſome Months.

If the *Fiſtula* is open on the Outſide, we intend to attempt its Cure by Medicaments. We are to begin with dilating it to the Bottom with Gentian Root, or prepar'd Spunge; after which, to cleanſe it with *Unguentum Apoſtolorum*, *Unguentum Egyptiacum*, or pulverized Mercury. If the Bone be rotten, we are to touch it with ſome Dregs of Oil of Sulphur, or Oil of Vitriol, ſoaked into a little Cotton, which being laid on the Bone, will put a Stop to the Corruption; but withal take Care not to put the Patient to much Pain with theſe Ingredients, for fear of drawing on a Fluxion. To all the circumjacent Parts we are to apply ſeveral Bolſters moiſtened in refreſhing Waters; after which the Ulcer will cleanſe, dry, and cicatrize, according to the common Methods.

All Practitioners agree the moſt certain and expeditious Cure of the *Lacrymal Fiſtula* to be the actual Cautery, before the Operation of which, it will be neceſſary to premiſe theſe few Things: Firſt, whether there is any external Orifice, or whether, if there be, it is large enough. If there be none, we are to make one, and in caſe it be too little, it muſt be enlarg'd: To which End, ſome Authors will have us apply a potential Cautery betwixt the Eye and the Noſe, as far from the Eye as poſſible, taking Care that we do not cut the Ligament of the great *Canthus*, or Corner of the Eye, which will occaſion Squinting, or make the Patient Blear-eyed; and that in making a ſmall Scarification, we dilate the *Fiſtula* to the Bottom, that it may be prepared to admit the actual Cautery. But other Writers, on a better Foundation in my Opinion, direct us to open this *Fiſtula* with the ſtraight Inciſion Knife *E.* making a ſmall Orifice in the Form of a Creſcent, in order to clear of the Juncture of the Two Eye- and to carry the Inciſion to the uncov bare Bone, to which they apply the Stopples of dry Lint *F. F.* to abſorb Blood and Humidities, afterwards laying the reſt of the *Apparatus*, in order to ap the hot Iron the next Day.

The Hour then being come, and all Th in Readineſs for cauterizing, the Pat muſt be ſeated in an eaſy Elbow Chair, vided with a Side-leaning Place for his He and then we are to take off the *Appara* in order to ſearch it with the Probe *G.* w ther the Bone be perfectly uncovered, t with a Bolſter *H.* and a Band *I.* we co the other Eye, that the Patient may have any Apprehenſion of the Fire; t we lay on the Eye, next the *Fiſtula*, the B ſter *K.* wetted in cooling Waters, wh reaches over the Temple, being pierced the Place where the *Fiſtula* is. The Bol is to be large, to prevent hurting the O rator, and wetted, to keep the Fire from neighbouring Parts. The Probe *G.* wh we again thruſt into the Wound, ſerves guide to the Bone a ſmall *Infundibulum* Funnel *L.* with a Handle *M.* by which is held in the Left Hand. We withdr the Probe, after having fixed the Funnel to the Hole, of which we inſert a falſe T of Lint *N.* to dry the little Quantity Moiſture which may have ſoaked into Bottom of the Wound, and the Bone th dry, with the Right Hand we thruſt actual Cautery, or cauterizing Iron *O.* hot into the Cavity of the Funnel to Bone, leaning lightly on it. If we thi the Firſt did not make a ſufficient Impreſſ on the Bone to diſſipate all the Moiſture, then apply a Second Cautery *P.* for wh Reaſon we are always to lay Two Cauter in the Chafing-Diſh *Q.* full of Fire to heated. We then draw out the Funn whoſe Uſe is not only to conduct the actu Cauteries, but to ſpare the Patient the pa ful Feeling of a Burning Fire.

The Cauterizing being performed, ſtuff up the Wound with ſmall Buttons Stopples of Lint, above which we lay ſmall Plaiſter of *Ceruſe R.* of a Shape ad ted to the Part, covering the Eye with a fenſative Plaiſter, and laying over that

ngular Bolſter with the uſual Band for *Lacrymal Fiſtula T.* In the future Dreſ- , we are to take Care that the Fleſh does grow again too faſt, and cover the Bone in before 'tis exfoliated, by reaſon that wing over the burnt Part, it injures the nd Place, and when they join together, are to be ſeparated by Exfoliation. We then to conſume this Fleſh with the ve-mentioned Powders and Ointments. en we believe this Separation of the e to be made, which does not always ibly appear, but which we may ſecurely ugh conjecture by a good Fleſh coming and ſticking faſt to the Bone, we then r the Wound to heal, and bring it to trize.

the Ears, and adjacent Parts, Figure 42. *From* Dion.

Hough the Ears are Parts the leaſt ſubject to Operation, there are yet Two s in which they cannot be diſpenſed : One of which is, when they are naly ſtop'd; and the other, when ſome ck or foreign Matter has enter'd them. me Children come into the World with Ears ſtop'd, which, if not remedied, will not only prove deaf, but alſo b, by reaſon that never hearing others 'tis not poſſible to learn to ſpeak, no ſpeaking any Language that we ever by Nature, but ſuch as he learned or of another. The Cauſe of this Deafis generally a ſmall Membrane which the Ear, and is placed either externalr at the Bottom of the Paſſage near the n. When 'tis external, 'tis eaſily cut the Inſtrument *A.* The Orifice being , we are to thruſt in a Leaden Pipe, or a Stopple, till it is wholly cicatrized. when the Membrane is thick, and aphes the Drum, it is very difficult to y any Remedy to it; for if we at- to pierce it, we run the Riſque of pe- ing the Drum alſo; and if we would Uſe of the Cauſtick to conſume it, e yet under the ſame Apprehenſions, r of cauterizing the Drum. Since the ulty of conveying Medicines directly Place affected, becauſe the Paſſage is very narrow, ſtill remains, all that can be done, is gently to inſinuate Ingredients which do not corrode, but may by their Uſe by little and little attenuate and thin the Membrane.

We have Recourſe to Surgery when ſomething is gotten into the Ear; if a ſmall Fly, or an Inſect, and we cannot ſee it, we may then draw it out with the Forceps *B.* and if it be gotten too far in, we are to ſearch for it with the Ear-pipe *C.* turning that Inſtrument at the Bottom of the Ear, as we do when we endeavour to get out the Wax which grows there: But if it be a little Bit of Flint, or a Cherry-ſtone, *&c.* ſtuck there in Jeſt, or ſlip'd in by Accident, we then begin with dropping ſome Drops of Oil of Sweet Almonds into the Ear, then laying the Patient on that Side, we ſhake his Head a little, in order to force out what was before got in; and if it does not come out according to our Wiſhes, we are then to draw it out with the Forceps *D.* or with the Ear-pick, which we ſlide in on one Side of the Stone, in order to get that Body into the Cavity of the ſaid Ear-picker, and by that Means to bring it out with it. If theſe Methods do not ſucceed, we may make an advantageous Uſe of a ſmall Cork-ſcrew, which forcing into the Cherry-ſtone as into a Cork, we bring off that exotick Body along with it. Several make Uſe of a Levitor, in the ſame Manner as is uſual to draw a Bullet out of Gunſhot Wounds: And laſtly, others propoſe the making behind the Ear an Inciſion in the Shape of a Creſcent, in order to diſcover the exotick Bodies, and take them out at the Orifice. But this laſt Way is not to be practis'd, unleſs only when it is impoſſible to draw out theſe Corpuſcles, becauſe it is to make an Orifice which one is afterwards obliged to ſew up, and which is not eaſily cured by reaſon of the Cartilage of the Ear, which we cannot avoid cutting.

The *Parotides* are conglomerated Glands, ſituate near the Ears, betwixt the poſterior Angle of the Cheek-bone and the *Maſtoide Apophyſis.* Their Uſe is to ſeparate the Spittle, and convey it into the Mouth. When there is an Obſtruction in the Ducts of theſe Glands, a Maſs of Humours gathers there, which ſwells them, and occaſions a very

great Pain. Children are very ſubject to this Indiſpoſition, which is cured by rubbing the Part with Linſeed Oil made very hot, and covering it with Wool; the Oil dilates and mollifies the Humour which the Glands had ſoak'd up, and the Heat of the Wool reſolves it; yet theſe Tumours often come to Suppuration, ſo that ſome Summers they become as it were epidemical among the Women; for when theſe Tumours terminate in ſmall Abſceſſes, we are obliged to open them barely to give Vent to the Matter, and avoid the Deformity of a Scar.

There is a great Difference betwixt the Tumours which come on the *Parotides* of Children, and the Swelling of the ſame Parts in Perſons advanced in Years. Thoſe of the Firſt are compoſed of a Humour which is gentle, and of an eaſy Digeſtion: They ripen in a little Time, and heal when the Matter is come out. But in adult Perſons they excite greater Pains, and produce a Scar like that of an *Anthrax*; wherefore they ought to be ſufficiently open'd to procure the Falling of the Scar, and Cauſticks are neceſſary to conſume the Hardneſs of theſe Glands; after which, we are to cleanſe the Wound, incarnate it, and diſpoſe it to cicatrize with as little Diſfiguring as poſſible.

The *Goetre* is a large Tumour which grows on the fore Part of the Neck: 'Tis ſoft, pendant and moveable. The *Savoyards* are almoſt all attacked by this Indiſpoſition, as well as thoſe inhabiting the Mountains, who are obliged to drink Snow Water, and that of cold Springs; but theſe People not complaining of any Pain, have ſeldom Recourſe to any Remedies, but ſee theſe Tumours begin, grow, and encreaſe to an exceſſive Bulk, without any Concern, or being in the leaſt diſturbed with regard to the Conſequences which may reſult from them. They give this Diſeaſe the *Italian* Name of *Gozza*, which imports a ſwoln Throat. Some ſtile it a *Bronchocele* by Reſemblance, as though it were a *Hernia* of the *Bronchia*. The *Greeks* call it *Bronchokili*, from *Bronchia* the *Aſpera Arteria* or Windpipe, and *Kili* a *Hernia*, becauſe the Tumour which riſes on theſe Parts is like that produced by the *Hernia*: But that Name is improperly applied to them; for the *Hernia's* proceed from miſ-

placed Parts, but the *Goetre* reſults fro
ſoft and pituitous Fleſh contained in a C
or Bag.

If the *Savoyards* are not ſurprized at
Growth in this Diſtemper in their Coun
the Women of other Parts are of quite
ferent Opinions, and cannot conceal t
Uneaſineſs when they find the leaſt Sw
ling in the Throat, and their Fears encr
in Proportion to the Growth of the
mour, not by reaſon of the Pain ſo m
as becauſe it ſpoils the Shape of their N
We are then firſt of all to endeavour to
ſolve this Swelling with a Plaiſter of *Di*
tanum, which is excellent in this Caſe,
vided it be long worn, and renewed e
Eight Days. But if the Tumour ſtill
creaſes, and we are under an Apprehen
that it may grow to a prodigious Bulk,
are prudently to proceed to an Extirpati

The Patient may eaſily prevail upon h
ſelf to undergo this Operation, for it is
ſo painful as may be imagined, the moſt
quiſite Pain he is ſenſible of being
which he feels at the making of the Inci
of the Skin for the whole Length of
Tumour with the Knife *E*. and 'tis
this Performance that we begin this O
tion. This done, the Lips of the O
are to be widen'd, one being inclin
the Right, and the other to the Le
make Room for taking hold of the Tu
with the Forceps marked *F*. and to di
or cut it out in its whole Circumference,
order to extirpate it entirely as envel
in its proper Membrane. The Veſſels w
moiſten it are very ſmall, and the a
Inſenſibility of the Tumour ſufficient
vinces that it does not take in a conſide
Nerve. We need not ſew up this W
no more being neceſſary than to wa
and draw its Lips together with the un
Bandage, which is to be begun at the
Part of the Neck, and whoſe Two
paſs over the Wound. If this Operat
dextrouſly perform'd, there remains
an almoſt imperceptible Scar, and th
tient is freed from a Tumour which w
have plagued her during her whole Li

The King's Evil, called by the
Scrophula, and the *Greeks Choirades*,
Choiras, which ſignifies a Hog, from
militude of theſe Tumours in Man

t

Neck of that Animal, which is filled with ſuch Glands. They proceed from a thick Flegm, which is ſometimes acrimonious and ſalt in thoſe which are painful. Children are moſt ſubject to them, becauſe moſt greedy and voracious, and eat the oftenеſt: And thoſe Children which live on Pulſe, Fruits, and indigeſted Aliments, are almoſt all ſcrophulous, by reaſon that the Chyle which is produced being crude, and not ſubtilized without Difficulty, ſtops in the Poroſities of the Glands, where they produce theſe Tumours: Whence it is obſervable, that Seventy five in a Hundred of thoſe which come for the Royal Touch, are the Children of Peaſants, who have contracted that Diſtemper by groſs Feeding.

The King's Evil, which ſhall be treated of more at large when we come to the Glands, under which Head this Diſtemper will properly fall, is cured by a good Regimen of Living, and by general as well as particular Remedies. The Uſe of the *Panacea, Mercurius dulcis*, and a diſſolvent Opiate, in Conjunction with the Application of the *Emplaſtrum de Vigo*, on the Gland affected, daily cures it. But if the Humour is obſtinate, foul and acrimonious, and it tends to Suppuration, we are to open the Tumour, after having try'd all Methods capable of mollifying its Hardneſs: We then dreſs it with corroſive Unguents, which tend to cicatrify, becauſe we are not to expect a Cicatrize before the Gland is wholly conſumed.

If only One or Two Glands are tumefy'd, and they happen to be the external and leſs moveable Ones, we are rather to remove them by Inciſion than Cauſticks, which occaſion a continual Pain, and require a conſiderable Time. If then the Patient is fully reſolved, and has Confidence enough in his Surgeon to throw himſelf wholly on his Conduct, he is then to place him in a very good Light, ſeated in an Elbow Chair, a little leaning backwards, with his Head held by one Servant, and his Hands by another; and then with the Lancet *G.* we are to make a longitudinal Inciſion on the Gland, only on its Skin, beyond which this Inciſion is not to advance; then the Operator takes in his Left Hand the pointed Inſtrument *H.* with which he lays hold on the Gland, in order to ſeparate it the more readily, by cutting with the Lancet all the Fibres which faſten it to the adjoining Parts; and to facilitate its Diſengagement, the Operator is to cauſe one Lip of the Wound to be held by an Apprentice with the flat Inſtrument *I.* which ſeparates the Skin from above the Gland. When one of the Sides is thus looſen'd, we are to apply the ſame flat Inſtrument to the other Side, in order to ſeparate it in the ſame Manner as the former; and thus we are to take out the whole Gland. The Wound being well cleanſed, with a Feather we convey into it a little Balſam of *Peru*; then we are to cloſe the Edges of the Orifice, which we are alſo to cover with the Pledget *K.* above which is to be laid the Plaiſter *L.* to cover the whole with the uniting Bandage which I ſhewed you in the *Goetre.* We are not to dreſs this Wound every Day, but let it agglutinate the Skin with the neighbouring Parts, which is finiſhed by the Balſam, ſeconded with the Reſt which is to be given to the wounded Part.

For the Tongue and Uvula. *Taken from* Fig. 41. *of* Dion.

THE Tongue requires its particular Operations; the Firſt of which is the Inciſion of the *Frænulum* or String, which is preſcribed in Two Caſes: One is when there is a ſupernumerary Ligament, and the other when the natural One is too big or too ſhort.

Children are frequently born with a Membrane faſten'd to the natural *Frænulum* under the Tongue, and which hinders its coming out beyond the Lips, or performing its ordinary Motions. The Midwives ſometimes tear it with their Nails, which Practice is not always exempt from Inconveniencies, by reaſon that they cannot thus break this Membrane, which is very ſtrong, without giving great Pain, and often drawing to the Part a Flux, which diſenabling the Child from ſucking, ſoon deprives it of Life; wherefore they ought not to attempt to rend or cut it, this Operation not belonging to their Function, but to the Surgeon, who may very eaſily perform it, provided he does not neglect any of the eſſential Circumſtances.

If this ſupernumerary Ligament is but little, it may happen to do no Miſchief; but when it is large, and reaches to the End of the Tongue, the Child cannot throw it out to the Nipple, but trifles with the Breaſt, not being able with all its Endeavours to get hold of it, becauſe this Bridle under the Tongue detains it, and will not ſuffer it to preſs the End of it againſt the Palate, in order to draw the Milk, in which Caſe the Child will die for want of ſucking, if the Surgeon be not called to its Aſſiſtance. The Operator is then to take in his Left Hand the little Fork *A.* and in his Right the Sciſſars *B.* when having cauſed the Child to be turn'd to the Light, he raiſes its Tongue, which he keeps elevated with the Fork that graſps the Ligament, whilſt with the Sciſſars he cuts off whatever he finds unnatural: When the Surgeon has no Fork at Hand, his Two Fingers may ſupply its Place, and will anſwer the End as well. The Child's Crying is of Uſe at preſent, for it ſhows the Ligament the more uncover'd. As ſoon as this Bridle is cut, we lay a little Salt on it, and rub the Finger over it ſeveral times, not, as ſome ſay, to hinder its joining again, for the continual Motion of the Tongue prevents that, but becauſe if it be not cut to the Bottom, the Finger may tear the reſt, which is very eaſily done, and the Nurſe immediately giving the Child the Breaſt, ſoon appeaſes it.

The Facility with which we ſee the Child ſuck, enables us to determine whether the Bridle is well cut, and prove the Neceſſity of Surgery by the Want which Mankind ſometimes have of that Art even from their Birth. There ought not to flow out from the Part above Two or Three ſmall Drops of Blood; for if the Part ſhould bleed much, it would be a Sign that the Point of the Sciſſars had touched One of the Two Veins under the Tongue, which ought to be carefully avoided: But in caſe this Miſfortune ſhould happen, we are to remedy it by ſtopping the Blood, either by the Application of ſome Medicaments or aſtringent Powders, or by holding the Finger on the Orifice for ſome Time, or elſe by covering it with a little Bolſter dipped in Styptick Water. When One of theſe Veins is open, and we diſcern it, there is little to be fear'd, becauſe it is eaſy to ſtop the Blood; but if it be not remedied, the Misfortune may become very great, as we have ſeen at *Paris* ſome Years ago. The Fact was as follows:

A famous *Pariſian* Surgeon cut the *Frænulum* of a Child, which had been impatiently expected, and joyfully received, being a rich Heir: But this Comfort did not remain long with the Parents, the Child enjoying the Light but for a ſhort Space, by reaſon that the Surgeon not ſuſpecting that in cutting of the Bridle he had open'd One of the *Ranulæ*, went away as ſoon as he ſaw the Child ſuck freely and eaſily; and the Nurſe having laid it in its Cradle after it had ſufficiently ſuck'd, it continued to move its Lips as though it were yet ſucking, which no Body took Notice of, becauſe many Infants habitually do the ſame whilſt ſleeping: But all this while it was the Blood which iſſued out of the Vein, which it ſwallowed as it felt it in its Mouth, the Flux of this Humour being the more excited by the Infant's Suction, till there was no more Blood in its Veſſels, which was no otherwiſe diſcern'd than by the Paleneſs and Weakneſs of the Child, that died a few Hours after; when it was open'd, and found to have ſwallowed all its Blood, with which the Stomach was filled. I cite this Obſervation on purpoſe to warn Surgeons againſt falling into the ſame Inadvertence.

If the ordinary Bridle of the Tongue be too thick or too ſhort, we are to cut it without Heſitation. We frequently meet with Children that liſp at Four or Five Years old, becauſe the Motion of the Tongue is not free enough to pronounce their Words articulately and diſtinctly. In this Caſe we are to give them Two or Three ſmall Cuts with the Point of the Sciſſars *B.* in ſeveral Places, in order to unbridle them, and by this Means ſet that Organ at Liberty to rove over the Mouth. When the Patient can put his Tongue out of his Mouth, we know that it is the Bridle which reſtrains him, and in this Caſe we have no Reaſon to be afraid of cutting it, provided we avoid pricking the *Ranulæ* Veins, which lie very near it.

There happen ſometimes under the Tongue ſmall Tumours, which are called *Ranulæ*,

Hypogloſſes which have ſomething of the Nature of Wolves; they are commonly fill'd by a viſcous Tumour, and when they once begin to appear, grow big in a ſhort Time, and ſome of them riſe to a dangerous Magnitude, if not check'd by proper Remedies. The Humour whereof they are compos'd is almoſt always contain'd in a *Cyſtus* or Bag; for which Reaſon ſeveral Authors adviſe us to diſſect and take them out wholly with their Membranes. But this not being ſo eaſily Practicable by Reaſon of the Length of Time requiſite to ſeparate this Tumour, to remove it as we ſhould a Wolf, and the Operating in ſuch a difficult and tender Place as the Mouth, we are to find out a more convenient and ſecure Way, which will prove to be that of making a ſimple Inciſion, by which the contain'd Matter being evacuated, the Indiſpoſition grows perfectly well; for the proper Medicaments for the Reſolution of theſe Tumours cannot be uſed in the Mouth, by reaſon that under the Tongue are two ſalivary Veſſels, which inceſſantly convey the Spittle into this Cavity, which wou'd hinder their Operation. We take then the *Scalprum* or *Lancet*, and with which the Mouth being open, and the Tongue raiſed, we make an Inciſion in the Middle of the Tumour, whoſe Matter is no ſooner run out, than we cleanſe the Bottom of the Purſe with *Mel Roſarum*, and a little Spirit of Vitriol, dipping into it a ſmall bit of Linnen faſten'd to the End of a little Rush, with which rubbing hard or ſcrubbing the Inſide of the *Cyſtus*, in order to exhaliate and conſume what would otherwiſe continue ſome Days, we then frequently waſh the Mouth with *Oxymel*, and after, with a rough Wine mix'd with a little Allom.

The Tongue hindring our ſeeing to the Bottom of the Mouth, Artiſts have invented an Inſtrument ſhap'd like a broad *Spatula*, and provided with a Handle mark'd *H.* which very commodiouſly removes that Obſtacle by holding the Tongue down ſo long, till we have found what we ſought after. But if the Patient opens not his Mouth wide enough to diſcover what we look at, we may uſe the other Machine *F.* call'd the *Speculum Oris*, with which we not only keep the Tongue in Subjection, but alſo force open the Teeth as much as is neceſſary: But we are not to make uſe of theſe Inſtruments till all the more eaſy Means are try'd in vain; for, if with the Handle of a Spoon we cou'd keep the Tongue, we are not to make a diſmal Show of ſuch Tools; the bare Sight whereof is enough to fright the Patient.

The *Uvula* is a ſmall carnous and cartilaginous Eminence, ſuſpended at the Bottom of the Palate on the Root of the Tongue. The Latins call it *Uvula*, and the Greeks *Pargareon* and *Kionis* with regard to its Uſe, and its Figure reſembling a Pillar, *&c.* which theſe Words ſignify. It requires a Surgeon in two Diſeaſes, to which it is ſubject, to wit, to raiſe it when relaxed, and cut it off when putrified.

Thoſe whoſe *Uvula* is relax'd feel it, as though it were a Morſel hung at the Bottom of the Mouth, and imagine they are ready to ſwallow it every Moment: When they find this, they complain to the Surgeon in the vulgar Phraſe, that their Palate is down, and intreat him to put it up again, believing a Luxation to have happen'd, as it does to ſeveral articulated Parts. In this Caſe the Surgeon is to ſearch before he makes any Attempt: If it is red, thick and inflam'd, he is to uſe gentle and cooling *Gargariſms*; and if white and lengthen'd, he is to raiſe it with the little Spoon, made on purpoſe for that uſe *H.* in which he is to put a little Pomegranate Rind and Pepper beaten to Powder; then after having caus'd the Tongue to be held down, he is to get the End of the *Uvula* into the Spoon which he is to puſh up, and hold that Part in it for ſome time. The Powder of Pomegranate cloſes the too much extended Fibres, and the Pepper by its Heat abſorbs the Pituity or Spittle which had ſoak'd into it: But the Surgeon is to take Care he does not make uſe of this Remedy when this Part is lengthen'd by Inflammation, as is ſometimes imprudently done, without any Regard to the Cauſe of the Indiſpoſition, which requires a direct contrary Remedy, wherefore we are not to be ſurpriz'd, if in this Caſe a Quinzy and Flux on all the adjacent Parts follow.

We find in certain Diſtempers a ſmall tranſparent white Tumour, reſembling a

Pearl, ſtuck to the End of the *Uvula*, which is cauſed by the Spittle which diſtills from the upper Parts, and glides to the extreme Point of this Eminence: If this Seroſity cannot be diſſipated and drain'd by Pepper and other Deſiccatives, the Tongue being turn'd down, we are to take the Sciſſars *I.* whoſe Branches are long, in order to reach to the Bottom of the Mouth, and cut off that Point full of a viſcous Liquid. The *Uvula* being clear'd, we are to uſe Aſtringent *Gargariſms* to contract the Fibres, and reſtore the Part to its former Condition.

In *Norway* and other cold Countries, the Inhabitants are ſubject to a Catarrh cauſed by a Pituitous Humour, which in the Winter diſtills on the *Uvula* and ſo enlarges it, as to ſuffocate the Patient, if not remedied. But the Diſeaſe is ſo preſſing, that they don't expect the Reſtoration of their Health from the Uſe of the Medicaments, wherefore they have recourſe to Operation, by which Means they cut off this Part as ſoon as poſſible. This Diſtemper is ſo frequent, that they are always provided with Inſtruments proper for this Operation; the moſt famous of all, which is that invented by a Peaſant in *Norway*, which cuts off the *Uvula* in a Moment by Means of a Spring which the Operator is to let fly as ſoon as he has plac'd this Inſtrument, which has had the Approbation of all the Surgeons of its Time, and *Sculletus* has given us its Deſcription in his *Armamentarium Chirurgicum.*

This Operation is but very ſeldom perform'd here, as well becauſe we are not expos'd to the ſame Catarrhs, as by reaſon we are prepoſſeſs'd with an Opinion that the *Uvula* ſerves to modify the Air which enters the Lungs, and that thoſe Perſons who have it cut off, grow Aſthmatick and Purſy, though *Sculletus* aſſures us that this Operation is not attended with any Inconveniencies: But when we are oblig'd to perform it, the Sciſſars *I.* are ſufficient after having thruſt down the Tongue with the Inſtrument *L.* and ſome won't allow even the Uſe of any Pincers, alledging that with them we ought to have three Hands, or make uſe of that of a Servant, which wou'd prove very troubleſome. I am ſurpriz'd to find ſome Authors in this Caſe propoſe t Ligature, and others the actual Cautery For was it poſſible to bind the *Uvula*, t Ends of the Thread which would hang the Throat, till the Ligature had perform its Section, would prove very troubleſom and if we ſhould convey a red-hot Iron the Bottom of the Mouth, whatever Pi we make uſe of to conduct it in, the P tient and Spectator would be affright and 'twould be very difficult to confine t Scar which wou'd ariſe from that Operati to the Part affected alone: We ſhall th content our ſelves with the Inciſion, whi is not attended with any ill Effect, becau the Veins being there ſmall, there iſſues o but little Blood, which with aſtringent a deterſive *Gargariſms*, we cure in a ſm Time.

On both Sides of the *Uvula* are two gr conglobated Glands, by ſome call'd *Tonſi* and by others the *Almonds*, from the Reſe blance they bear to peel'd Almonds; on th Glands there frequently happens a ſettli of Humours, which ſo ſwell them, that t Patient cannot ſwallow without Difficul We are not to ſpare Bleeding in theſe Ca in order to prevent the Obſtruction whi may happen to the ſanguinary Veſſels, they ſhould Tumefy exceſſively. Wh they are imbrued in Blood they always co to Suppuration, and that the rather, reaſon the moiſt Heat of the Mouth quic ly ripens them: As ſoon as the Patient fe a Fluctuation there, we are without De to open them with the Lancet *K.* wr about with a little Band as you ſee, wh Point is to be directed to the Tumo where we are to make an Orifice twice big as that uſual in Bleeding. This do the very Moment that the Matter comes o the Patient is eas'd: But the Tumour ſometimes fill'd with a ſort of burnt Blo which ſhows it ſelf, and leaves a conſide ble Scar, which we are to bring off. are then to make uſe of deterſive Gar riſms, compos'd of Barley, Agrimo Black-Berries, Red-Roſes, and Com boil'd in White-Wine and *Mel Roſa* mix'd with ſome Drops of Spirit of Vit which perfectly cleanſes theſe Parts: dip in this Mixture a Bit of Linnen ſaſt

the End of a ſmall Stick, with which we
o the Scar ſomething hard, which ſeldom
ſts this Remedy.

Some of our Anceſtors propoſe the Sepa-
ion and Evulſion of theſe Glands, which
eration they very eaſily performed, and
ure us that they will never more incom-
ode the Patient: I refer you to the Me-
ods which they propoſe of doing it, which
hink very cruel, and wou'd be glad of
me better Security for their Succeſs, than
ir bare Words: For the Function of theſe
ands being to ſeparate and filtrate the Se-
ities which ſerve to moiſten the Tongue,
rynx and *Oeſophagus*, theſe Parts muſt
d themſelves depriv'd of that Dew, which
of ſuch great Uſe in tempering the Air in
Lungs, and facilitating the Nouriſh-
nt down into the Stomach.

In the Throat, now and then are lodg'd
me exotick Bodies, as Fiſh-Bones, Needles,
s, *&c.* The firſt Thing to be done to
ar the Pipe, is to thruſt the Finger to the
ttom of the Mouth, and endeavour to
w them out, if we can reach them, but
hey are too far deſcended, the Patient is
ſwallow Bread-Crums half chew'd,
ich form'd like a Stopple, frequently
wes the other Bodies into the Stomach;
d in caſe they cannot get it down, but
pricks the *Oeſophagus*, the Patient is to be
vok'd to vomit, as the ſureſt Way to
ce whatever ſticks in the Paſſage. But if
t don't ſucceed, we are to thruſt down
Tongue with the Spoon *G.* or the *Specu-*
Oris F. in order to endeavour to diſco-
the Cauſe of the Stoppage in the Throat:
we can diſcern it, we are to make Uſe of
two Inſtruments *L.* and *M.* which are
y commodiouſly deſign'd to take hold of
draw out whatever ſtops the Throat,
of them *L.* has ſtrait Branches, and the
er *M.* curved ones, in Form of a Creſ-
t, to allow the Surgeon his Choice of
ich is moſt proper for his Uſe: But if
Matter be ſo far down in the Gullet
t we can neither ſee nor feel it, we are
thruſt into the Throat a peel'd Onion
b'd over with Oil, which we are to
e beyond the Place where we feel the
tick Body: Some faſten to the End of a
rſe Thread *N.* a little Bit of Spunge *O.*
the Bigneſs of a Haſle-Nut, which having ſoak'd in Oil, they oblige the Patient to ſwallow, and then draw it back by the Thread after it has paſſed the Place where the Body ſtops, and they tell us that the Spunge is to bring it up along with it. Other Practitioners condemn the Uſe of the Onion, alledging that it may chance to break in bending, to accommodate it ſelf to the Shape of the Throat, nor have they any better Opinion of the Spunge; for beſides that, 'tis almoſt impoſſible for the Patient to ſwallow it, 'tis poſſible that it may ſtick in the *Oeſophagus*, if the Thread ſlips through it, which may readily happen, conſidering it is of a Subſtance ſo eaſy to be torn: But they ſeem rather to approve a great Wax-Candle, which being Pliant, bends to any Shape at Pleaſure, and we have it certainly in our Power to draw it out again: The Surgeon may make uſe of any of theſe which he likes beſt, and tho' never ſo exquiſite in his Art, he will in this Caſe be frequently puzzled.

Of the Hare-Lip. *Taken from* Fig. 39. *of* Dion.

THis Deformity in which the upper Lip is cleft, was by the *Greeks* call'd *Colovoma* from *Holovein*, to diminiſh or ſhorten, and by the *Latins Mutilatio*, and in *French* and *Engliſh* Mutilation; this Word is equally proper with regard to the Ears and Noſtrils, when they are in any Meaſure defective; but when the Deficiency happens only to the Lip, 'tis call'd a *Hare-Lip*, from its reſembling the Lips of that Animal, which are cleft in this Manner.

The Lips may be cleft two Ways, either by Accident, as by a Blow, a Fall, or a Wound on that Part; or naturally, when it comes into the World with the Patient. The Lips are very often wounded by the Teeth under them; for they being hard Bodies firmly fix'd in their Places, and leaving a void Space betwixt them, 'tis impoſſible for the tender Lips to receive any hard Blow, without being ſlit as if they were cut with a Knife. Theſe Wounds are no otherwiſe to be cur'd than by Suture, by reaſon that we cannot diſpenſe with the Motion of this Part, either in Speaking, or the

the Reception of any Nouriture: The Suture is to be perform'd with the utmoſt Expedition, becauſe the Wound being in ſuch a ſpungy and moiſt Organ, would otherwiſe be encreas'd by this Motion. When the Suture is made, immediately after the Receipt of the Blow, we may ſpare either the Uſe of the threaded or implicated Suture, which by reaſon of the Needles left in the Wound, incommode it: But the interſected Suture will then ſerve the Turn, perform'd in the following Manner. We are to take the curved Needle threaded, marked *A.* and by the Help of the ſmall Pipe *B.* paſs through from without, inwards; and then again, from within outwards, taking up enough of the Fleſh to fix and faſten the Suture: We are next to tie together the two Ends of the Thread, on one of the two ſmall Bolſters *C, C.* on the Side of the Wound, and to take two or three Stitches purſuant to the Length of the Wound, cutting the Threads of each Stitch beyond the Knots, and covering the Whole with a ſmall Pledget charg'd with an agglutinating Balſam, together with a Plaiſter and Bolſter, which are to be faſten'd and ſecur'd by an incarnative Bandage.

When the Mutilation is natural, the Child being born with its Lip cleft like that of a Hare, or when in a Campaign Wound, through the Neglect of re-uniting and ſewing up the ſeparated Parts, they acatrize at a Diſtance from each other, the Surgeon is not then to hope to ſucceed by the tortile Suture: Becauſe that in this Caſe always wanting proper Matter, either by reaſon Nature has not furniſh'd it, or that the Cicatriſing has ſo harden'd the Edges of the Wound, that he is forced to act it, in order to renew it, and make Way for the reclo-ſing and agglutinating them; if he ſhould not leave the Needles in, 'twould be impoſſible to keep the Wound ſubject, and its Lips wou'd ſeparate from each other, on occaſion of the leaſt Motion. Let's now ſee what is to be done before, during the Time, and after the Operation.

Before the Operation, we are to examine the Conſtitution of the *Hare-Lip*; for if the two Edges are ſo widely ſeparated from one another, that we think it impoſſible to get them together, we are not to try the Operation: We are then to have regard to the Age of the Child, and not to put it in Practice before it reach the Age of five or ſix Years, for a ſucking Infant, or one which cries very often, is not in a Condition to undergo this Operation, which requires Reſt: The Child muſt be of an Age capable of Reflexion, and of being ſenſible touch'd with the Indiſpoſition with which it is afflicted; and knowing that, muſt deſire a Cure, and reſolve to ſuffer all poſſible Endeavours to obtain it; for ſhou'd the Surgeon attempt it before then, it would be impoſſible for him to ſucceed, by reaſon that the Child's Lips are neither thick nor ſolid enough to ſuſtain the Needles neceſſary on this Occaſion. But if the Patient's Age and Mutilation allow a Re-union of the divided Parts, we are to diſpoſe the Apparatus as you ſee repreſented in the Plate belonging to Fig. 39.

During the Operation, the firſt Thing the Surgeon is to do, is to examine whether the Lips does not ſtick to the Gum, which if it does to any Part, it muſt firſt of all be ſeparated by the Inciſion-Knife *E.* the Operator taking Care that he does not anticipate the Operation, by touching with the Knife either the Gum which would uncover the Jaw-bone or the Lip, becauſe that rendring it thinner, it wou'd make the Cicatriſure more difficult. This Caution duly obſerved, we are with two Pair of Pincers *F, F.* to pinch the two Edges of the *Hare-Lip*, fixing theſe Inſtruments one after another in ſuch Manner, that whatever we deſire to retrench from theſe Edges paſs beyond the Pincers, which we are to cloſe, puſhing the Ring of each of them towards the upper Extremity; then with the Sciſſars *D.* or the Inciſion-Knife *E.* according as we find moſt convenient we are to cut off the Edges, in order to make a freſh Wound, renewing the old one to the Bottom, for where-ever any of the old Scars remain, the Re-union can never be made. The Pincers being removed, we are to let the Wound bleed a little, then having dry'd it, we take one of the ſtraight round Needles *G,* which we run through the Lips of the Wound ſuſtain'd by the ſhort ſmall Pipe. To the ſecond Needle which we paſs is fixed a Thread which we turn around theſe two

Needl

Needles, and wind a-croſs from the one to ther, forming in the Middle a St. *Andrew's* oſs, and flatting the Edges of the Wound y theſe Means, we aproximate them to one nother. We are to paſs the firſt Needle hrough the lower End of the Wound, that e may not leave at that Extremity a longer nd of the *Hare-Lip* than the other, and the econd Needle is to be placed betwixt the rſt and the Noſe. The Thread being well ound about and faſten'd, we cut off the oints of the Needles, if too long, with the ncifory Pincers *H.* and lay on the flat Bol- ers *I, I.* as well over the Heads as Points f the ſaid Needles, that the Skin may not e rak'd or hurt by the Bandage, which is o faſten on and retain the Whole fix'd in his Poſture.

After the Operation, the next Thing to e done, is to dreſs the Wound in ſuch anner, as to anſwer the Surgeon's Inten- on. If we have been oblig'd to diſ-join e Lip from the Gum, we are to thruſt a little linnen Rag betwixt theſe two Parts, that they may not re-unite, we are to lay on the Wound the Pledget *K.* cover'd with white Balſam of *Peru*; then the Plaiſter *L.* cut and dented to accommodate it to the Part, over that the Bolſter *M.* of the ſame Figure; and laſtly, the Bandage *N.* provided with four Ends, and when fix'd, call'd the Sling; from the Reſemblance it bears to that Machine: We apply the Middle of the Band to the Wound, taking hold of the two upper Ends, which paſſing directly over the Ears, make a circular Turn about the Head, and then taking the two lower Ends, we refold them in the Middle under the Lip, that mounting then above the Temple, we may faſten them to the Cap. Having put the Patient to Bed, we oblige him to a ſtrict Reſt, and order his Broths and Drink to be given him through a Pipe or Tunnel, that he may move his Lips as little as poſſible.

Of Wounds in General; and of thoſe belonging to the Muſcles in Particular. From Wiſeman, Muſitanus, Belloſte, Le Clerk, *St.* Hilaire, Ettmuller, Charrierre, Vaugion, *&c.*

A Wound, ſays Mr. *Wiſeman*, is a Solution of Continuity in any Part of the Body ſuddenly made, by a Thing that cuts or tears, h a Diviſion of the Skin.

According to Mr. *Le Clerk*, a Wound is a ent, violent and bloody Rupture or So- ion of the natural Union of the ſoft Parts de by a pricking, cutting, or bruiſing trument.

t. *Hilaire* ſays, a Wound is a Diviſion, a Solution of Continuity that is freſh bloody, made upon a ſoft and fleſhy by ſome external Cauſe.

Ettmuller calls it a Diviſion of the natural ion made in a ſoft Part, from ſome outward violent Cauſe, as a Stroke, Cut, Bite or Bruiſe.

Galen defines it to be a certain Breach or Solution of Unity left upon the fleſhy Part; and *Muſitanus*, to bring it to his own Principles, ſays, a Wound is a Separation of Continuity by a radical Balſam, with an Effuſion of the ſaid Balſam made from ſome external violent Cauſe: It is call'd in *Greek* Τραῦμα, in *Latin Vulnus*. Mr. *Wiſeman* not content with the narrow Definitions he had met withal, to make it more comprehenſive takes in whatſoever makes a ſudden Solution of Continuity to be a Wound, ſo that the Skin be divided or broke; ſo that cutting into a Bone, tearing the Fleſh, Nerve,

Nerve, Sinew, Tendon or Cartilage, by Bullet, Stone, Splinter, *&c.* is a Wound, which admits of many Differences, that are either taken from their Figure or Situation.

With regard to their Figure, they are call'd Long, Broad or Wide, Triangular, Great, Little, Superficial or Deep; and with reſpect to their Situation, they are term'd Simple, Complicated, Dangerous or Mortal.

A ſimple Wound is that which only opens the Fleſh, and hath no other concomitant Circumſtances; but a complicated Wound on the contrary, is that which is attended with grievous Symptoms, as Hæmorrhages, Fractures of the Bones, Diſlocations, Lameneſs, and others of the like Nature.

A dangerous Wound is that which is complicated, the Accidents whereof are dreadful: As when an Artery is open'd or prick'd, when a Nerve or Tendon is cut, or when the Wound is near a Joint, and accompanied with a Diſlocation or Fracture. A mortal Wound is that which muſt be inevitably follow'd by Death; as is that which is ſituated deep in a principal Part neceſſary for the Preſervation of Life, ſuch as the Brain, Heart, Lungs, Gullet, Diaphragm, Liver, Stomach, Spleen, ſmall Guts, Bladder, Womb, and generally all the large Veſſels.

Wounds are in themſelves ſo viſible, that they need no general Marks to be known by: But the peculiar Affections of the particular Parts hurt, and the Methods of diſcovering what inward Part is wounded, by Obſervation made of the Symptoms that happen, ſhall be more fully handled in treating of the Wounds of the ſeveral Parts.

The Wound being a Solution of Continuity, doth require to be made one again, Unity being the Perfection of whatſoever hath a Being. To effect this, is the Work of Nature and Art; both muſt mutually join their helping Hands, and unleſs both the vital Faculties and Nouriſhment of the Part aſſiſt the Surgeon's Art, it will be Labour in vain. Here muſt be a joint Concurrence and mutual Agreement.

In ſimple Wounds, the Surgeon is give his Aſſiſtance four ſeveral Ways, Omitting any of which will render negligent or ignorant in his Buſineſs. firſt is in careful and diligent taking a all extraneous Bodies, that by their Inte ſition may hinder the true Agglutinatio the ſeparated Parts, whether they be crete Blood, Hair, Sand, Duſt, Piece Bones, Cartilages, Rags, or the like. Second is, in bringing the Lips of Wound even together, that they may Conſolidation be reſtored to their fo Figure. The Third is in conſerving Temperament and natural Heat of the P in order to Unition. The Fourth is in venting ill Accidents, and correcting as have already ſeis'd on the Part.

Thus much is requir'd if the Wound only ſimple, but if it be a compo Wound, with Loſs of Subſtance or Co ſion, then he hath ſomething more to As where there is Loſs of Subſtance, t we muſt aſſiſt Nature with Sarcoticks, regaining what is loſt; and where ther Contuſion, there he muſt endeavour turning what is contuſed into *Pus* or M ter, which muſt be perform'd before can poſſibly be any Re-union: As lon there is any ſtrange Body or different S ſtance to keep off the Unition, you n not hope to make any Cure of a Wou therefore if any ſuch be to be drawn fo before you attempt it, conſider ſeriou *1ſt*, Whether it can be done or no? *2dly*, Whether ſafely? For Firſt, ſomet the Weapon ſticketh ſo faſt, that it ca by any Art be extracted; then it is of ceſſity to be left to Nature, who in Caſe ſometimes worketh Miracles, fo have known Pieces of Splinters, *&c.* ſtic faſt in the inward Parts, and ſo encl that we cou'd not by any Means get t out, yet at length upon Apoſtemation o Part they have work'd out. Secondly, are to conſider whether you may with ty pluck out the Weapon or no: Some live a Day with the Weapon in their B who wou'd expire upon the Moment o traction; but if your Judgment ſugg you that the Patient is recoverable, haſt out with it before the Part be infla

f the Weapon has pierc'd deep, and thro' t Veſſels in nervous Places; or if the t oppoſite to it be full of Veins, Arte- and Nerves, or have a Bone lying in the y, or over-againſt the Wound; if there no great Fear of Laceration, pull it out ſame Way it went in. For the effecting which our Maſters have left us Variety Inſtruments, the Figure and Uſe whereof u may ſee in *Sculteti*, but have more par- ularly delineated from the Tenth Demon- tion of *Dion*'s Chirurgical Operations, tained in the Firſt Volume of *Bibliotheca atomica, &c.* But if the Point of the apon have pierc'd above half Way thro' Member, and there be no Bones nor arkable Veſſels to hinder you, either uſt the Weapon through, or make Way it by Inciſion on the contrary Side; but ware the Weapon be not too big, leſt you e Two large Wounds for One.

f the Weapon ſtick in the Bone, move p and down to looſen its Point, and then k it out; but in caſe it will not move, away the Bone before you extract it. en the Weapon is drawn out, cleanſe it n Rags, or any Thing elſe, and permit Wound to bleed accordingly as in your gment you ſhall think fit, ſtill having pect to the Conſtitution and Habit of Body, that what is in the ſmall Veins aſunder may flow out, as well to hin- the Inflammation, as the Generation of h Matter. The Bleeding being ſtay'd, if e be Hair growing about the Wound, e it off, then wipe away the clotted od with a Spunge dip'd in Red Wine, crate, or Water; but if it ſtick deep in Wound, be not too buſy with your ed Probe, for thereby you may ſtir up a Bleeding; whereas this concreted Blood s the Wound warm, and defends it from outward Air, and by Digeſtion Nature throw it forth.

he Second Intention is performed by ging the Lips of the Wound exactly to- er. This Intention is in few Words, they are to be obſerved as a Law; for out that Reduction of the Lips, a ſlow deformed Healing follows. Nature nothing to do here in bringing the together, that's the ſole Buſineſs of the eon, who muſt not lay a Pledget, or crowd a Doſſil of Lint or Tent into a little Wound, for that is the Way to keep it open, and make it painful, whereby Defluxions are raiſed, the Temperament of the Part weaken'd, and the Cure prolong'd, contrary to the Intention of all who have writ of Wounds, and to the Practice of the moſt knowing Surgeons.

The Third Intention is Deligation, or Retaining the Parts ſo joined together. For the effecting of this, our moſt famous Maſters have left us Two principal Means, *Rolling* and *Stitching*, to which ſome, nay moſt of them, added *Claſps*. But I will not put you upon that: If the Wound be ſmall, and in a fleſhy Part, and according to the Length of the Fibres, you may perform the Cure by *Bandage*; for here Nature will truly act her Part, by Application of Blood, and Nouriſhment to both Sides indifferently, and finiſh the *Coalitus* without your farther Aſſiſtance: And this is that which gives ſuch Credit to the Sympathetick Powder, in the Application of which it becomes every Surgeon to be much experienced, in reſpect of the unſpeakable Advantages which the whole Art receiveth thereby.

By Bandage the Parts are not only dextrouſly accommodated for Union, but ſuch alſo as would naturally grow together, are kept aſunder. In Burnings, Scaldings, and the like, the Fingers would many times grow together, the Chin would grow to the Breaſt, the Arms to the Sides, were they not this Way hinder'd. By them Fluxes are averted, and the Delapſe of Humours into the inferior Parts forbidden; and being already lodg'd, they are preſs'd out. By theſe good Juices are advantageouſly forced into Parts emaciated: As, if the Right Arm pine away, roll up the Left from the Hand to the Armpit, that the Blood being preſs'd out into the *Vena cava*, or rather hindred to flow in ſo faſt by the Artery, nay with more Eagerneſs flow into the other Side, where it was wanting. By theſe we ſee great Fluxes of Blood, large Hæmorrhages, every Day ſtay'd; and by them the true natural Form and Beauty of the Part is commonly preſerved.

The moſt eminent of the Profeſſion have recommended to Poſterity Three diſtinct Sorts of Faſcitation or Rolling: The Firſt

they term the *Incarnative* or *Agglutinative*, the Second the *Retentive*, the Third the *Expulsive*, all which are largely treated of in the First Volume of this Work, and to which I must refer you, to avoid Prolixity, but for the present shall give you our Author's Description of them in as few Words as the Nature of the Subject will permit.

The *Incarnative* is that which brings the Lips of the Wound together, and conserveth them in their right Figure. It must be more strict than the *Retentive*, and more loose than the *Expulsive*, and is the most useful in simple, fresh and yet bleeding Wounds. The *Retentive* is us'd to keep your Dressing on close about the Wound. They are for the most part only us'd in Wounds of the Head, and there must be a Moderation in binding with this Bandage. The *Expulsive* is performed by a Roller of one Hand. The particular Use of it is to expel Matter out of Fistula's or sinuous Ulcers; as also, to prevent the Descent of Humours, and to expel such as have already seated themselves upon the Part wounded, or otherwise. To these *Fallopius* adds Four more, *viz.* 1. *Fascia Disjunctionis*, by which rolling Parts are kept from joining together, as the Fingers when bare of the *Cutis*. 2. *Fascia Directionis*, which assisteth in making a crooked Part straight, or bendeth a Part unnaturally straight to its proper Figure.

3. *Fascia faciens Apostema*, is that which will procure an Apostem, by summoning the Matter up into one Part which might perhaps dangerously flow into others, and those the more principal ones. 4. *Fascia prohibens Apostema*, which hinders the Collection of Matter, and consequently the Generation of an Apostem.

The next Thing that offers it self for keeping the Lips of the Wound together, are *Sutures*, and there are of Three Sorts: 1. The *Incarnative*; 2. The *Restringent*; and 3. The *Conserver*. The First is that which is in most Use amongst us, and is by making so many Stitches at a Distance: The Second is the Glovers Stitch, and much in Use amongst the *Spaniards*: The Third is of Use in great Wounds, and those of the *Oesophagus*, *&c.* to hold them forcibly together. It is performed with Pins or Needles, as in Hare-lips.

In the Incarnative you are to consider t
Wound; but if you find it but the Leng
of a Finger's Breadth, or a little more,
not worth the Stitching, for your Applic
tion of Medicaments and Bandage will ke
the Lips together, and quickly heal it.
the Wound be of Two Fingers Breadt
make Two Stitches; if Four Fingers Breadt
Three Stitches; and so go on, making
Stitch less than the Wound is in Number
Fingers. Sometimes in declining Parts
make our Stitches at a little more Distance

The Time of taking out the Stitches,
when the Parts are agglutinated, which
sooner or later, according to the Habit
the Body or Season of the Year. Commo
ly in great transverse Wounds Eight Da
are required, in less Wounds not so de
Three or Four. In the Face do it the ne
Dressing, lest the Stitches make so ma
Scars. But in this Work you must use yo
Judgment; for sometimes the Wound m
seem to be agglutinated, while the Lips a
held together by the *Suture*, which, after t
Stitches are cut out, is not so exactly cic
trized, but that you might have done bet
to have left the Stitches a Day longer: B
in this Case the Dry Stitch may help yo
and that is another Way of keeping th
Wounds together. They are made wi
little Bits of strong Linen Cloth, triangul
or quadrangular, or of such Figure as m
serve your Purpose. These are most prop
in the Face, to avoid the other Way
stitching; yet they are of Use in other Pa
to preserve the Lips close. They are co
monly spread with a Mixture of Drago
Blood, Frankincense, Aloes, Wheat Flow
Gum Tragaganth, of each equal Parts, wi
the White of an Egg. They ought to be
such a Consistence that they may adh
firmly to the Skin, and applied at such
Distance that they may best perform th
Work. After they are dried on, you m
bring the Lips of the Wound close togeth
and retain them so, taking Care they be n
wet with the Matter.

The Fourth Intention is the preserving
natural Temperament of the Part, that the
by Agglutination may be obtained, wh
is the Work only of Nature, by whose
gle Power all Parts wounded, disjoin'd a
broken, are knit and made one again: B

n regard there is a certain *Medium*, which nſwers in Proportion to a Glue, required n this Work, Nature taketh what is next t Hand, even the Nouriſhment of the art which is injured, to make it of. *Ubi otus, ibi Remedium*, is here an Oracle, Where he Diſeaſe is, there is the Remedy. No ooner is there a Wound but the Balſam is iſcovered. Blood, at leaſt the ſerous Part f it, is the Glue which ſhe uſeth both in uring by the Firſt and Second Intention.

The Means that perform theſe are the Regimens us'd to the Patient, which are either Univerſal as to the Diet, or Particular as to he peculiar Management of the Part it ſelf. s to the Univerſal, we are all to conſider irſt, whether a full or ſlender Diet be to e uſed. As for other Things, ſuch Diet is o be obſerved as their Strength will permit. We do not uſe to purge with Catharticks in Wounds, leſt by moving the Matter, it ow to weak Parts; but we allow Lenitives, as Caſſia, Tamarinds, Manna, Senna, Rubarb, with Sal Prunellæ; alſo Electuaries, as Lenitive Electuary, Syrup of Roſes olutive, Syrup of Succory with Rubarb; lſo Broths, wherein Lettice, Succory, Enive, Sorrel, Purſlane, Borrage, Buglois, and e like, have been boil'd: And we let them lood according to the Strength of their Boy, and as Symptoms indicate.

Another Part of the Regimen of wounded Perſons will conſiſt in giving of vulnerary Drinks, of which we find many in all ur Diſpenſatories and Herbals. The moſt ommon Simples with us are, Comfry, Bugle, adies Mantle, Agrimony, Sanicle, *Paul's* etony, Mugwort, Plantane, Horſe-Tail, dders-Tongue, Cinquefoil, Wild Tanſie, ervein, Ground Ivy, Golden Rod, Centau-, St. *John's* Wort, Snakeweed, Knotgraſs, ouſe-ear, Yarrow, Scordium, Tormentil, ſtort, Valerian, Red Roſes, *&c.* Some of eſe are made Choice of to be boil'd in ater or White Wine, with an Addition Honey. Their principal Uſe is in Wounds the Breaſt and Belly, yet they are frently preſcribed in all great Wounds. metimes alſo if the Diſeaſe run high, we d Guajacum, Sarſa, and Scorbutical Meines, with Powders of Crabs Eyes, Crabs aws, and Coral.

The Particular Regimen is in preſerving the natural Heat and Tone of the Parts, without which we can hope for no Union. For the better Underſtanding hereof, I muſt put you in Mind that there is not any Part of our Body admits of a Solution of Continuity without Pain: Every Scratch in the Skin, and a little Cut in the Finger, is painful, much more are the deeper Wounds in the Fleſh. This Pain ſtirs up a Heat, which ferments in the ſerous Part of the Blood, and readily makes its Way to the Wound, which, if not timely prevented, diſtends and raiſeth the Part into a Tumour with an Inflammation.

To proceed rationally by this Intention in Wounds, your firſt Application ought to be of ſuch Medicaments as have an agglutinative Faculty, a Bole, Dragons Blood, Frankincenſe, Aloes, Gum Elemi, Pitch, Turpentine, *&c.* and apply over them ſuch as are cooling, and of an aſtringent Quality, to reſiſt the Influx of the Humours, as Cloths dip'd in the Juices of the following Plants, Horſe-Tail, Plantane, Yarrow, Elm Leaves, or Red Wine, or Oxycrate; to which you may add ſome of theſe Powders, from Red Roſes, Balauſtians, Cypreſs Nuts, Galls, Barley Meal, and Bean Flower, with Oil of ripe Olives. Theſe ſimple Medicaments may be proportionably mixed according to the Habit of the Body, and Condition of the Wound. In ſmall Wounds, Nature of her own accord is wont to do the Buſineſs, ſhe ſeldom requiring more from us than that the Lips of the Wound be brought cloſe together, and defended from the Flux: But in greater Wounds, that will not be ſo eaſily cured, we ſtitch the Lips together, and ſprinkle them with ſuch like Powders as this: Take Bole, Frankincenſe, and Dragons Blood, mix'd equally together, and apply with the White of an Egg, and over them a Compreſs, and a ſuitable Bandage. This is generally the Way; but leſt by the ſticking of this Plaiſter, the Lips of the Wound ſhould be torn, or diſturbed in taking off the Dreſſing, I chuſe rather to apply over the ſprinkled Powders a Pledget, with ſome of the following ſarcotick Ointments: Take Turpentine, Three Ounces; Gum Elemi, Two Ounces; Dragons Blood, Frankincenſe, and Maſtick, of each One Ounce; Make with theſe an Ointment, over

which apply a Plaiſter of *Diapalma*. In all Wounds where I deſign to cure by Agglutination, and would preſerve my Stitches, I forbear the Uſe of Fomentations, or any ſlabby Medicines.

Thus far for ſimple Wounds: I ſhall now conſider of Wounds with Loſs of Subſtance, made by a violent Inſtrument; as, Bill, Pole Ax, Sword, *&c.* ſome cutting twice or thrice in one or near the ſame Place, whereby the Wound is large, tranſverſe, and ſometimes oblique, at the ſame Time, and the Lips contracted various Ways, and ſo the Cure is render'd much more difficult. Theſe Kinds of Wounds are not ſo frequent in Times of Peace, but very common in Battels.

In order to the Cure of theſe Wounds, you are in the firſt Place to cleanſe them, and then endeavour the bringing of the Lips together by the Incarnative *Suture*, making ſo many Stitches as may hold them ſo. And if you doubt this Way not to be ſufficient, you may then, as in a Hare-lip, paſs Needles or Pins through the Lips of the Wound, with little Plates of Lead to ſecure them from tearing: But if the Wound be ſo deep as you ſuſpect its incarning in the Bottom, you muſt leave a declining Orifice for the Diſcharge of Matter. If the Wound hath laid long undreſs'd, or were not ſtitch'd at the firſt Dreſſing, and be now ſo contracted and ſtubborn that the Lips of it will not be brought near one another, you muſt then foment them warm with ſome emollient Decoction; as, of Marſh Mallows, common Mallows, Violet Leaves, and Linſeed, or with new Milk; then join them together, as hath been ſaid, and dreſs them as Wounds ſo ſtitch'd. But if you left a declining Orifice, keep it open by a ſmall Tent dip'd in ſome ſuch Medicaments as ſhall be by and by preſcrib'd; and after Digeſtion, withdraw the Tent, and heal it as ſuch like Wounds. The greater Wounds, which cannot be brought together by Suture, muſt be digeſted, and ſo diſpoſed as that new Fleſh may be generated to fill up the Cavity: To which Purpoſe, take Turpentine, Three Ounces; Barley Flower, Six Drams; Frankincenſe, One Dram; mix them with the White of an Egg: To this, after a Day or Two, may be added Honey of Roſes; during which, the Humo ought to be diverted from the Wound the Univerſal Regimen, ſet down by Ble ing, Purging, *&c.* and by the external A plication of refrigerating Medicines, w good Compreſs and Bandage to preſs Lips of the Wound together, that it may ſooner cur'd. After the Wound is digeſt you may deterge with *Paracelſus*'s *Mundi tive*, or with this of *Quercetan*'s, which alſo a good Sarcotick. Take Plantane a Smallage Leaves, of each a Handful; R Roſes, half a Handful; Claret, Eight O ces; boil half away, and in the ſtrai Liquor diſſolve Two Ounces of brown gar, and One of Turpentine, Aloes, Myrrh, of each a Dram: Then boil ag and by adding a ſufficient Quantity of W reduce it to an Ointment. As to the T of dreſſing Wounds, the Second Dreſſ ought not to be till the Third Day, which Time we ſuppoſe them ſomewhat geſted; after that every other Day may ſufficient.

If the Wound be made by a Fall or Bl with great Contuſion, you muſt endeav that the bruis'd Fleſh be digeſted and tur into Matter; to which Purpoſe the O ment of *Baſilicon* is proper, applied warm on Lint, or diſſolv'd in Oil of Earth-wor Linſeed, or ſuch like, anointing the P about with Oil of Roſes and Myrtles, w the Whites of Eggs, which make up int Reſtrictive, adding to it Bole, Drag Blood, Red Roſes, and apply it over But if the Wound were of ſome Conti ance before you was conſulted, you m then foment it with Diſcutients, and brocate the contuſed Parts with Oil of momil, Elder, and Rue; and continue Application of Maturatives. After the paration of the contuſed Fleſh, the Lo Subſtance muſt be reſtored by Sarcoti and the Wound cured as aboveſaid; membring, that in theſe Contuſions Bl letting is moſt neceſſary. If the Wound deep, and the Orifice narrow, yet cap of enlarging, it muſt be laid open pro tionably, that the Matter may not be tain'd, and render the Wound more holl But if the *Sinus* be of any great Len and ſo depending that the Matter can diſcharge by the Wound, you may

ake a Perforation in the lower Part, for Diſcharge of it, by Knife or Cauſtick, or oth, firſt Cauſtick, then Knife; or by a *eton Needle* with a twiſted Silk or Thread, s hath been ſhew'd in ſinuous Ulcers, and roceed accordingly.

If a Fever attends great Wounds, eſpecial- where there is an Inflammation, where it almoſt inſeparable, you are the leſs to rouble your ſelf thereat; but if it conti- ues after the Pain and Inflammation is re- oved, and you have a Delirium or *Syncope* ith it, there is great Cauſe to doubt the Welfare of your Patient: Therefore haſten ervulſion by Bleeding or Bliſtering; alſo ſe Clyſters, and Lenitive Medicines, to ooſen the Body; and preſcribe Juleps, E- ulſions, which, by allaying and tempe- ing the Heat, may relieve the Patient.

Of Wounds in the Limbs. From Wiſeman.

ONE of our Mariners in *Spain* fighting on Shoar, was thruſt with a Rapier in- o the Outſide of the Arm, nigh the *Biceps*. Surgeon in the Town ſeeing him bleed uch, ſtitch'd the Wound cloſe, and ap- lied his Reſtrictives, rolling up the Part ell. After Three or Four Days the Patient me abroad, and being in Pain, deſired me dreſs him. The Arm being ſwell'd and nflam'd, I cut the Stitches open, and gave ent to a bloody *Sanies*, after which fol- w'd a digeſtive Matter. Finding by Search ith my Probe the Wound wanted little of aſſing through, I embrocated and dreſs'd it p with a ſhort Tent, arm'd with my com- on Digeſtive, and endeavoured by good andage to cure it; but it not yielding ereto, I paſs'd a Seton Needle through, ſcharging the Matter downwards; and af- r that Apertion was digeſted, I dilated it, nd kept a Tent there a few Days, during hich, the upper Part of the Wound heal'd p, and the Wound below digeſting well, nd the Matter daily leſſening, I alſo heal'd at up. This I inſert to ſhow you, that ch Wounds ought not to be ſtitch'd, but reſs'd up with Aſtringents, Compreſs and andage; for theſe Wounds, in a good Ha- t of Body, do frequently agglutinate in a few Days; whereas dreſs'd by Tents, they are of longer Continuance, and render'd at laſt difficult of Cure.

While I was in the King's Service, in the Time of the War in the Weſt Country, I was fetched to Captain *M.* who, in fight- ing a Duel, was run thro' the Thigh with a broad Sword. I was alſo ſent for at the ſame Time to the other. I haſtily dreſs'd this Officer's Thigh with Pledgets ſpread with Sarcoticks, over both the Orifices, bringing the Lips of them cloſe with Com- preſs and Bandages, and ſo left him to be put to Bed by his Servants. From thence I went to dreſs the other, who had many little Wounds on his Fingers, Hands, and Head. At my Return I viſited my former Patient, whom I found in his Bed with little Pain. The Second Day after I atten- ded him, and finding all in good Temper, without Pain or Swelling, I dreſs'd the Wounds as I had done before, there being good Signs that they would heal up by Ag- glutination, for there was little either of Matter, Pain, or Swelling. If it had ap- peared inflamed with Tumour or Pain, I ought then to have dilated the Orifice moſt diſtemper'd; and if they had both ſuffer'd, I might have kept them both open with ſmall ſhort Tents ſpread with the common Digeſtives, and have let him Blood, and proceeded as in a Body ill habited; but there was no Need, there only requiring a quiet Poſition of the Part, which he ſub- mitted to, and was happily cur'd in Seven or Eight Days. This was really performed by the Balſam of his Blood, I neither bleed- ing nor purging him in the Time of his Cure.

A fat Gentleman came from *Rocheſter* wounded in the Thigh with a Tuck. It was much inflamed by reaſon of the Tent in it, which was very long; his young Sur- geon ſuppoſing the Wound could not be cur'd, unleſs the Tent reach'd to the Bot- tom of it. I threw out the Tent, and dreſs'd the Wound with a Pledget of *Baſilicon*, em- brocated it with Oil of Roſes, and applied a Plaiſter of Bole to it, then let him Blood. He being feveriſh, I alſo preſcrib'd a Clyſter, and ſent him an anodine Draught to diſ- poſe him to Reſt that Night. The next Day I found him in good Temper, and his Wound.

Wound inclin'd to heal. I dreſs'd it as the Day before, and adviſed him to keep his Bed 3 or 4 Days: About two Days after I viſited him again, and taking off the Dreſſings, ſaw his Wound perfectly cured: So it continued, and he walked abroad the next Day.

A Perſon was wounded in the Inſide of the Arm, the Sword paſſing over the Joint ſlanting to the Outſide of the Arm: He was firſt dreſs'd by a Surgeon near the Place where he was hurt, and had bled much. The next Day he complaining of Pain, I open'd the Wound and found it tented on both Orifices, the Arm ſwelled and a little diſturb'd, as Wounds in that Place are ſubject to be when the Blood is ſhut in by Tents, and not dreſs'd rationally by Aſtringents and good Bandage: The Swelling was moſt between the two Orifices, and appear'd afterwards to be the Blood choak'd in by the Straightneſs of the Bandage, and was not likely to yield otherwiſe than by Suppuration: I fomented the wounded Member with Diſcutients, and kept both the Orifices open with ſmall Tents dip'd in the common Digeſtive, embrocating the Parts about with Oil of Roſes and ſome Drops of Vinegar, and applying over all a Bole Plaiſter. The third Dreſſing there appear'd Blood from that Orifice on the Inſide of the Arm, I fill'd it with Precipitate upon a Doſſil, and dreſs'd the Wounds up as before; then acquainted him with my Thought of opening the Swelling between the two Orifices, there being no Likelihood the Matter cou'd diſcharge it ſelf by either of them, yet it was not ſafe to heal them up. Wherefore I open'd the Tumour lying between them with a little Cauſtick, and diſcharg'd a grumous Blood with a little *Serum*: From that Time I left off the Uſe of Tents, and heal'd that Wound up in 3 or 4 Days; and as the *Eſchar* ſeparated, the Ulcer digeſted, and I cur'd that latter Opening ſoon after.

A Perſon was wounded in the Outſide of the right Leg below the Gartering-Place, the Wound running upward. After ſix Weeks Dreſſing by the neighbouring Surgeons, the Wound being much diſturb'd by a Flux of Humours, I was conſulted, and found it ſinuous, ſome two Inches upwards, and accompanied with an Inflammation and Tumour. The ſmall of the Leg and Foot were *Oedematous*, and the whole Member ſo weaken'd by the Influx, that it was neither able to aſſimilate its Aliment nor yet to reſiſt the Crudities that fell upon it, and ſo was like to be of difficult Cure. In order to facilitate which, I laid open Part of the *Sinus* by Inciſion, and deterg'd the Wound with *Paracelſus*'s Mundificative mix'd with red Precipitate, embrocating the Parts about with Oil of Roſes, with Vinegar and applying *Galen*'s Cerate over the inflamed Tumour. I fomented the *Oedematous* Tumour with a Decoction of Wormwood, Scordium, Elder and Chamomil-Flowers, Myrtle-Berries, *&c.* applying over the Whole the Implaiſter of *Diachalcitis* with good Bandages, not renewing thoſe Dreſſings more than once a Week, to give a Breathing to it. By the aforeſaid Method of Dreſſing, that Part of the Wound I had laid open deterg'd, and the Inflammation and Tumour remitted: I afterwards divided the remaining *Sinus*, and deterg'd it as the former, and with Ointment of *Diapompholygos*, cicatriſed it by the Help of a laced Stocking, in the Space of about a Month. This Perſon had been long kept in his Chamber by his Wound, and now ſuppoſing himſelf well, he rid to his Country Houſe unknown to me, but that Night his Leg ſwell'd much, and the Cicatrice being ſcarce confirm'd, broke out again; upon Sight whereof he returned back the next Day and ſent for me. His Leg being inflamed, and the *Cicatrix* fretted quite off, I fomented the Member with a Decoction of Mallows, Violets, Plantane, Nightſhade, and Red-Roſe-Flowers, and endeavour'd by the Application of *Baſilicon* to digeſt it, but it not yielding thereto, I applied Refrigerants on the external Parts, and a fine Lawn wet in a Solution of *Rhaſis*'s white Troches made in a Decoction of Plantane, Horſe-Tail, *&c.* over the Excoriation, alſo the white Ointment camphorated over the Lawn upon Pledgets ſomewhat diſtant from one another, leſt the Matter ſhould be ſhut in by the Adheſion of them, and fret the *Cuticula* more off. Thus I dreſs'd it twice a Day, he keeping his Leg upon his Bed to prevent Defluxion: By this Method the Heat

Heat and Acrimony of the Humour being mitigated, I applied over the Lawn Epulotics more drying, as Powder of burnt Harts-Horn, *&c.* and at laſt with much Difficulty cicatris'd the Ulceration; whereas if this Wound had been treated Methodically in its Recency, it might poſſibly have been heal'd in few Days by Agglutination.

Of Wounds and their Operations from Vaugion.

WOunds are Simple or Complicate: Simple Wounds are a bare Diviſion of the Fleſh, not attended with any ill Accident. Complicate Wounds, are ſuch as are attended with various Accidents, as Pain, Inflammation, Contuſion, Loſs of Subſtance, *&c.* In external Wounds the Diviſion of the Fleſh is Viſible, but internal are not ſo eaſily diſcover'd.

If a Wound penetrate the Breaſt, and the Patient bring up Blood in Coughing, and you can hear the Air come out of the Wound in Expiration, it is a Sign the Lungs are wounded and the Veſſels hurt.

If there be a plentiful Effuſion of Blood from the Breaſt, and the Puſh is directed towards the Heart, there is ground to fear that that important Organ is wounded.

If the Blood that comes from it be hot, black and boiling, it is probable the right Ventricle is hurt, but if it be of a florid Scarlet colour, and frothy, it is the left Ventricle which has received the Thruſt.

When the Heart is wounded, the Arteries beat feebly, the Face turns pale, the extreme Parts grow chill, and the whole Body is cover'd with a cold Sweat.

If the Diaphragm be wounded, the Patient can ſcarce Breath, feels a great Pain in the Back, Shoulders and Arms.

If the *Spinal Marrow* be hurt, the Nerves are relax'd, all Senſe loſt, and ſometimes the Seed and Urine comes away involuntarily.

If the *Aſpera Arteria* be hurt, the Patient ſpits Blood, has a great Pain towards his Back, the Voice becomes Hoarſe, and the Tongue dry.

If the Guts are hurt, and the Wound be ſmall, there happens Syncopes, Inquietude, Convulſions and Fever. If the Patient vomit or void Blood by Stool, or the Fæces come forth, it is certain the Wound is large.

If the Thruſt be in the Belly, and there happen a plentiful Effuſion of Blood, it is a Sign the great Artery or *Vena cava* is cut.

When the Stomach is wounded, the Patient has cutting Pains, bilious Vomiting, cold Sweats, the *Hiccup*, loſes all Appetite, and the Aliment comes out of the Wound, if it be very large.

If the Wound be on the right Side, a little above the Navel and penetrates far in, and ſomething obliquely towards the baſtard Ribs, and black Blood come plentifully from the Wound, the Party wounded feels great Pain in thoſe Parts, vomits Gall, and lies on his Belly better than in any other Poſture, you may pronounce the Liver to be wounded.

If the Wound be on the left Side deep, and near the Seat of the Spleen, and a black Blood iſſue from it, it is a Sign the Spleen is hurt.

In Wounds of the Kidneys, the Patient piſſes with great Difficulty, the Urine is bloody, and a Pain is felt in the Groin.

Where the Sphincter of the Bladder is hurt, the Urine flows out involuntarily; and if at its Bottom, it comes out in the Belly, and through the Orifice.

There is Reaſon to fear the Brain and its *Meninges* are hurt when the Fracture of the Skull is of a large Extent, the Eyes are ſwoln and full of Pain, the Face is red and inflam'd, the Patient is *Comatoſe*, a Fever is kindled with a hard Pulſe, ſhaking Fits frequently recurring, and Vomitings: He voids Blood by the Noſe, Mouth or Ears; the Excrements and Urine come away involuntarily, and a Syncope, Vomitings, Convulſion, Delirium, Lethargy and Apoplexy enſue. The Lungs and Liver apoſtemate, which is diſcover'd by a fix'd Pain on the Sides of the Breaſt, or the Region of the Liver, or by frequent Rigours: All or ſeveral of theſe Signs concurring, are ſufficient to ſhow the Brain is hurt. When the Nerves are hurt, Inflammation, Pain and Convulſions uſually ſucceed.

Wounds of the Head are moſt commonly dangerous by reaſon of the Nicety of the Brain and its Membranes, which ſeldom eſcape Alteration when the Head is wounded.

Great Wounds of the *Dura Mater* are mortal, becauſe of the Diviſion of its Blood-Veſſels; but if the Wound be ſmall and remote from the *Sinus's* or principal Veſſels, the Patient may eſcape well enough.

Wounds in the Spine of the Neck, *Aſpera Arteria*, and *Oeſophagus*, are mortal; thoſe in the Blood-Veſſels and Nerves are dangerous, it being difficult to ſtop the Blood, if the Wound be large.

Wounds of the Breaſt are not very dangerous when they are external, but if they penetrate, there is much to be fear'd upon account of the Lungs and Heart.

Wounds which penetrate the Ventricles of the Heart are mortal, and the great Flux of Blood inſtantly kills the Patient: But if the Wound be near its Bone, the Patient may live ſeveral Days. Wounds of the *Pericardium* are mortal as well as thoſe of the Lungs, and ſo are Wounds of the Thoracick Duct, and Receptacle of the Chyle, by reaſon no new Blood can be prepared for want of this Juice: Great Wounds of the *Diaphragm* are mortal, becauſe Reſpiration is interrupted.

Wounds of the Stomach and Guts are mortal, it being difficult to re-unite them by reaſon of their Periſtaltick Motion, the Chyle and Excrements flow through the Wound, and cauſe great Putrefaction in the lower Belly.

Wounds of the *Meſentery* are not mortal, except the Blood-Veſſels, Lacteals and Lympheducts are cut, in which Caſe the Blood and *Lympha* flowing into the Belly, make great Putrefactions.

Wounds of the Lungs are not always mortal, and thoſe of the *Omentum* are only ſo upon the Account of the Diviſion of the Veſſels.

Wounds of the Liver are mortal, by reaſon of the numerous Veſſels in that Bowel, which admit of no Application; beſides, the Heart and Lungs ſuffer by Communication of their Nerves, from whence proceed *Syncope's*, vomiting of Bile, and Difficulty of Breathing.

Wounds of the Gall-Bladder are mortal, becauſe this is the Receptacle of the Bile, b whoſe Imitation the Expulſion of the Excr ments is made.

Deep Wounds of the Kidneys are morta becauſe theſe are the Receptacles and Strain ers thro' which the Urine is percolated.

Wounds of the Ureters are mortal, b cauſe the Urine falling into the Bell corrupts its Contents. Wounds of the Ute rus are very dangerous, or, to ſpeak mo plainly, mortal: To conclude, all Wound of the great Veſſels of the lower Belly a mortal, it being impoſſible to ſtop the Flu of Blood.

The Cure in ſimple Wounds, conſiſts i re-uniting the divided Parts, in removin all external Obſtacles, ſuch as coagulate Blood, and extraneous Bodies, in bringin together the Lips, and applying vulnerary agglutinating, and balſamick Remedies.

Since the Blood is the Balſam which Na ture makes uſe of for the Re-union o Wounds, the Surgeon muſt be careful t prevent all Corruptions of this noble Li quor, by extirpating the Seeds of Diſtem pers, rectifying its Fermentations and Di geſtions, and reſtoring it to its natura State.

To this Purpoſe conduce Clyſters t cleanſe the lower Belly, mild Purgative and laſtly Diaphoreticks, which purify th Blood and ſweeten the nutritive Juice, ſuc as Diaphoretick Antimony, half a Dram Crabs Eyes, two Scruples; Sperma Ceti, on Scruple; Chalk, half a Scruple; Salt of Lead four Grains: Give the Mixture in ſome pro per Vehicle, as a Glaſs of Carduus, or an other Sudorifick-Water; or take Mint an Chervil-waters, three Ounces; Crabs Eyes one Dram; Diaphoretick Antimony, on Scruple; Salt of Wormwood, half a Scru ple; Venice-Treacle, Sperma Ceti, and Sy rup of Speedwell, of each a Dram: Of thi Mixture, give ſome Spoonfuls from time t time to the Patient, and then cover him cloſe.

The ill Impreſſions of the Air muſt b corrected by balſamick Applications, whic muſt be Volatile, Saline and Oleous, reſem bling the Blood which is the natural Bal ſam, ſuch as Balſam of *Peru*, Oil of St. *John* Wort, the Juice from the Peel of Elms di ſtill'd in Ralneo Mariæ Oil, of Turpentin allay'd

allay'd, with Balſam of *Peru*, Balſam of Sulphur, *&c.* But Oils by Expreſſion without any other Preparation are dangerous, as well upon account of their Viſcoſity, which makes them hurtful to the Nerves and hinders Tranſpiration, as by a certain latent Acid able to corrode Iron and Silver.

Sharp Medicines muſt not be applied to Wounds open too long, which waſt the Fleſh and Blood, and by their Acrimony bring Pain and Fluxion. Only temperate Balſams are proper to Parts replete with Blood, and temperate, Fomentations inclining to acid and bitter for the nervous Parts. Add to theſe, Vulnerary Potions made of the Decoction of proper Plants, as Great Sanicle or Ladies Mantle, Ground Ivy, Speedwell, St. *John*'s Wort, Chervil, Crabs Eyes, boil'd in White-wine and drunk, every Part of which is vulnerary. We muſt not uſe theſe Balſams if it be neceſſary to keep the Wound open, as in thoſe which enter the Cavity of the Breaſt, for fear of any Matter which may happen to be lodg'd there, or any Inflammation or Contuſion; for here, if the Wound be clos'd too ſoon, we have no Means left to prevent Accidents. Suppuratives muſt be uſed, which are ordinarily made of Turpentine, the Yolks of Eggs, with the Addition of a little Honey, Myrrh, Balſam of *Peru*, and Gum Elemi, and after a laudable *Pus* obtain'd, treat the Wound like a ſimple Ulcer with Mundificants, Sarcoticks, and agglutinating Medicines.

Wounds then are cured by applying Balſamicks, removing extraneous Bodies approaching their Lips, and retaining them by Bandage and Suture. Hare's Greaſe is eſteem'd excellent to draw extraneous Bodies out of the Wound, whether the Part be rubbed with it alone, or mix'd with Ointment of Betony, or made into a Plaiſter with Gum-Arabick. It is pretended, Radiſhes Dictamny of *Crete*, mixed with this Greaſe, have the ſame Virtues; or take Crab's Eyes, Hare's Greaſe, of each one Ounce; white Amber, three Drams, mixed, apply them; to theſe add Savin, Periwinckle, Crab's Eyes, which are proper Ingredients in Vulnerary Potions, to expel all extraneous Subſtances.

Tents dip'd in ſome good Balſam, muſt be kept in deep Wounds till their Bottom be cleans'd, that their Fleſh may grow up to their Sides, without which it wou'd encreaſe too faſt, the Orifice cloſe, and the *Pus* and Filth lodge within, from whence Pains and Inflammations of the Abſceſs, Fiſtula's and deep Cyſtis's return. But before any Tent be put in, it is neceſſary to conſider well if no nervous Part lie on the Side of the Wound; in this Caſe, Tents too long or big will inevitably create acute Pains which irritate the nervous Parts, corrupt their Juice, and cauſe a Dryneſs and Extenuation of the Part. The Tent muſt not be very big except it be in the Middle, not filling the Wound that it may have room to ſwell: Its Point muſt be ſoft, for fear of hurting the Fleſh, which begins to renew and grow again. Tents muſt not be too long continued, becauſe they are apt to generate a Callous on the Edges of the Wound, which obſtruct Re-union; but muſt be diminiſh'd by Degrees, to give the Fleſh Liberty to grow.

A ſerous Humour gleeting from the Wound in the Time of Cicatrizing, makes the Fleſh flabby and ſoft, occaſions Excreſcencies, hinders the Unition and Skinning. Here Deſiccatives muſt be uſed to abſorb exceſſive Humidity, and moderate Aſtringents to correct the Laxity of the Fleſh, and give them a firm Conſiſtence. There happens ſometimes an unequal Roughneſs and Hardneſs in the *Cicatrix* after the Part is heal'd, which proceeds from the Fibres of the Skin, not exactly meeting thoſe which they are ſeparated from, and the Pores and Channels which before the Diviſion were ſtraight and anſwering to each other, are confounded and diſplac'd; and from hence the nutritious Juice being detained and ſtopped in the Part, produces a Callous in the Bones, and a Cicatrix in the fleſhy Parts, eſpecially if Reſtringents and Deſiccatives have been employ'd, which contract the Pores, make the Fibres firm, and harden the Part.

Wounds contus'd, eaſily putrefy, and this obſtructs the Cure; for this Reaſon, if the Contuſion be ſlight, you muſt have Recourſe to Suppuratives to ſeparate that which is mortified and bruiſed. But if the Contuſion and Wound be very great, and you have Reaſon to fear a Gangrene before

you can obtain a Suppuration, you muſt make Inciſions into and ſcarify the Part to give Iſſue to the Blood, and ſuppurate the reſt with good Digeſtives, adding *Ægyptiacum* by Way of Precaution. From the firſt you apply Topicks on the Part, proper to prevent Corruption, ſuch as Oil of Wax, with which rub the Part, laying on the Emplaſter of Cummin, Oil of Philoſophers, Emplaſter of Bay-berries; or take Roots of the greater or leſſer Conſound Chamomil, and Melilot Flowers, of each one Ounce; Saffron, one Scruple; Bean-flower, and Fenugreek, of each an Ounce and half; boil theſe in Water, firſt putting in the Roots; then add Worm-wood, Powder of Cummin-ſeed, of each half an Ounce; mix theſe, and apply them outwardly. When the greateſt Part of the Contuſion is overcome, rub in Spirit of Sal-Armoniack diſtill'd with Quick-Lime, which is an excellent Medicine.

Of Wounds. From Monſieur Belloſte, *Surgeon Major to the Hoſpitals of the* French *King's Army in* Italy.

MY Deſign in this Place is to entertain my Reader with a general and comprehenſive Idea of my Way of Practice, that may quadrate to all the different Sorts of Wounds that occur: And I dare confidently affirm, the Method I have taken, howſoever new it may appear to many, ought not to be number'd among thoſe Things that are more Curious than Profitable: Reaſon ſpeaks for it; Nature vouches it; Experience confirms it, putting it beyond all Doubt; and about Three thouſand wounded Perſons happily cured by it, may warrant any one in the Uſe of it.

If I condemn Tents as Inſtruments unprofitable and deſtructive, 'twas Experience convinc'd me of their Miſchief, and I hope henceforward, moſt Surgeons will appear on my Side: If I recommend in a ſpecial Manner a gentle and ſpeedy Way of Dreſſing, I muſt herein be juſtified by all Men of ſound Judgments, and indeed I don't Queſtion but every reaſonable Perſon, after he has been rightly inform'd, will ſufficiently approve what I have advanc'd in this Matter.

To conclude, in aſſerting that the Air is hurtful to Wounds, I have ſaid nothing but what *Hippocrates*, *Galen*, and many others were ſufficiently convinc'd of. 'Tis known to all, that the cold piercing Air is very pernicious to our Nature; on this I have enlarg'd a little, according to the ſmall Meaſure of Underſtanding wherewith I am endowed. I ſuppreſs frequent Dreſſing, that Nature may be allow'd Time to act, and to reſtore the wounded Parts to their firſt Condition, which ſhe can't do, when ſhe is often interrupted in her Work.

I have ever obſerved this as a general Rule, to dilate by *Inciſion* Gun-ſhot Wounds at the firſt Dreſſing; as alſo all other penetrating Wounds, and ſuch as have a narrow Orifice. This is the true Way to keep off, and to avoid the general Accidents that happen in Practice, and to prevent being reproach'd when any troubleſome Symptoms fall out. I ſometimes uſe *Dilaters* at the firſt Dreſſing, to hinder the Union of the new Inciſions, to keep their Bones aſunder, and to leave an open Paſſage for Matter, or any Thing elſe to come away when Nature ſhall be diſpos'd to expel them, otherwiſe I uſe them not, leſt they ſhou'd hinder the cloſing up of the Wound.

When the Bleeding is obſtinate, I uſe calcin'd Vitriol, aſtringent Powders, Powder of dry'd Vine, Styptick-Waters, *&c.* This only in deſperate Caſes that I have recourſe to Roman-Vitriol, Aqua-Fortis, and the actual Cautery. I have ever in the firſt Dreſſings found much Advantage from Defenſatives, which I apply'd above and ſometimes below the Wound, to allay the Heat of the Blood, to moderate its Activity and reſiſt Fluxions; obſerving always to make them ſomewhat Emplaſtick.

I make the Diverſions without Loſs of Time, with intent to correct the univerſal Fulneſs to facilitate Circulation, and leſſen the Abundance of Blood that might fall upon the Parts affected. And one or two Bleedings at firſt, are of more Uſe than ſeveral after the Accidents or diſorderly Symptoms appear. I am always careful to empty the

lower Belly by Clysters, having found that the retaining of the Excrements is always a mighty Hindrance to the good Disposition of the Body.

When the Bleeding is great, I don't take off the first Dressings till the second or third Day after they are apply'd, that the wounded Vessels may have Time to unite: And provided the Season and the Pain, or other Accidents, don't hinder, I every Day take off the Rollers during that Time; and leaving only that which supports and keeps on the Astringents, I make Embrocations when needful, and renew the Defensatives: By this Means, I often avoid the Suffocation that may happen, if the astringent and emplastick Medicines are too long kept on the Parts; which by stopping up the Pores of the Skin, and retaining the Vapours that ought perpetually to pass out thro' 'em, are the Occasion of many very grievous Accidents that happen to Wounds; too great a Quantity of Bands and Compresses have often the same Effect.

I only use Pledgets after the first, and sometimes after the second Dressing, and continue the *Embrocations*, till the Contusion is dissolv'd, which may be in five or six Days more or less, according to the Bigness and Condition of it, or to the Nature of the affected Part. When a *Phlegmon* or an *Erysipelas*, *&c.* happens to a Wound, I avoid the Use of unctuous Things which are hurtful here, imploying only such Cataplasms as are proper for easing Pain, and sometimes also dissolving Medicines will, together with *Diversions*, and a proper Course of Diet, resist and overcome these Accidents.

I find it very profitable when I dress the Wound, to cover it with a Linnen Cloth, wet with warm Wine or Brandy, immediately after I have taken off the Dressings: This defends, strengthens, quickens and unites the Spirits, and hinders the Particles of the Air and the *Effluvia* therein to stick to the Wound or pass to the Bottom of it. After the first Dressing is over, I never search the Wound, either with my Finger or a Probe, unless there is an absolute Necessity for it; I also disallow the Use of dry Tents, so commonly imploy'd for drying up the Matter from the very Bottom of Wounds, and generally every Thing that may irritate or occasion Pain, or oppose the Design of Nature, which is the Healing up of the Wound.

I don't, as some do, take up a great deal of Time, in striving exactly to empty the Wound of all the Matter that is in it; but as quickly as can be I apply the Dressings, to hinder, as hath been said, the Action of the acid Parts of the Air, and the Dissipation of the Spirits, that the Strength of the afflicted Parts may be preserv'd as much as possible; which is very requisite, in order to enable them to bear up against the many Evils wherewith they are assaulted on all Hands.

When I affirm that the Matter ought not to be retained in Wounds, and that Nature wou'd not be at such Pains to drive it out, if she cou'd have any Advantage by its stay; this is to be understood of such Matter as is kept in by Means of Tents, which becomes hot, and ferments, and by its stay requires an ill Quality, and might be suck'd up by the Veins: For that which is laudable, is hurtful only by Accident, being of its own Nature balsamick, because it is ever mix'd with good store of the natural Balsam or nutritious Juice, which without Intermission flows into the wounded Parts.

It is not at all improbable that the *sound Matter* which comes from Wounds may promote their Cure when by the Hand and Diligence of a skilful Artist it is purefy'd and separated from its excrementitious Parts; for what remains is only the Balsam of the Blood. This will be more easily conceived by those who consider that there are some learned and ingenious *Italians* who cure the Bloody-Flux by a Salt drawn from the Excrements of the Patient; and also such as have a Dropsy, with the Salt of the Waters drawn from their Belly. *Ettmuller* also very much commends the Excrement of the Ears, or *Ear-wax*, as excellent for curing Wounds.

All these Things contain less balsamick Juice than the Matter that runs from Wounds, when unalter'd by the Heat of an essential or symptomatick Fever, when it has not remain'd long in the Wound, as being detain'd there by Tents, *&c.* or, in fine, when it's not deprav'd by the Use of

putrefying Medicines, or others of the like Kind, that deſtroy its natural Temperament.

Mr. *Verdue* ſpeaks very patly to this Purpoſe, when he ſays, that Matter is the chylous Part of the Blood; wherefore it is againſt all Manner of Reaſon what ſome Moderns require, to wit, that the Wound be wiped very dry, ſeeing thereby it is depriv'd of that which only can effect the Cure. When I know or am in Doubt that there is ſome extraneous Body in a Wound, which Nature would exclude by the Orifice, or that any Splinter is ſeparated from a Bone, without having to do with Tents, I ſufficiently dilate the Wound with prepared Spunge, or Elder Pith, or Gentian Root, fitted for that Purpoſe, that a free Paſſage may be given to any Thing that muſt come away.

I can't reſtrain my ſelf from highly blaming thoſe who very patiently marſhal up in Order a great Number of *Doſſils* or *Dilaters*, of which they make Three or Four Lays in Wounds that are any thing large, obſerving a certain Symmetry and Proportion, which expoſes to the View of Aſſiſtants a Method no leſs pernicious than contrary to common Senſe and Reaſon. As for the Decency and Seemlineſs which adorn and ſet off that Way, it will be no leſs conſpicuous in making large Pledgets of long and pretty fine Lint, that may at once reach over all the Extent of the Wound.

I my ſelf have experienc'd what a fond Opinion is commonly entertained of that cruel Method; for the greateſt Part of wounded Perſons believe themſelves neglected, if an Hour is not ſpent in ſearching their Wounds, and as much in applying the Dreſſings; but Charity obliges us to free them from their Error.

When a Wound is deep with much Loſs of Subſtance, I fill it only with Pledgets of fine Lint, leſt leaving an empty Space, it ſhould be fill'd up with Air. I apply them very ſlightly cover'd, or moiſten'd with ſome Medicine agreeable to the Nature and Quality of the Wound. Theſe are not ſo hard as *Doſſils*, and conſequently occaſion leſs Pain, and don't ſo much oppoſe the cloſing up of the Wound, being not ſo compact as to hinder the breeding of Fleſh, neither are they ſo apt as Tents to be loſt in the Wound, or fix'd in ſome Corner of its Cavity.

I am no leſs careful to ſuppreſs Injections than Tents, having obſerved their Effects to be no leſs pernicious; for they liquefy and diſſolve the Blood, enlarge the Wound, cauſe Pain, and make proud Fleſh grow. I diſallow alſo the Uſe of *Aromatick* Wines in Dreſſing; as alſo of Fomentations, which are frequently uſed by ſome, and contribute very much to the protracting of the Cure.

'Tis very certain that theſe Parts drink up the Moiſture, which ſoftens, relaxes, and puffs up the Skin, and paſſing through it fill them like Spunges; the natural Heat of the afflicted Parts is thereby ſuffocated and extinguiſhed; no perfect Concoction can be performed, but all is turned to Matter and Corruption: And if this Method is long continued, as it too often falls out, the Ligaments are relax'd, and the Patient is in Danger of being lame the Remainder of his Life.

This Way of Practice is in a particular Manner pernicious in Hoſpitals of the Army, where that which is neceſſary to give Remedies all their requiſite Qualities is not always to be had: For Inſtance, How can they be kept warm without a ſufficient Number of Clothes to preſerve the Patient from Cold? Hence it is, that in a Moment after Application, all the Dreſſings become cold and frozen, which occaſions *Oedema's* very hard to be cured, and oftentimes Symptoms that are yet more troubleſome.

A right Courſe of Diet is ſo neceſſary in the curing of Wounds, that without it an infinite Number of Accidents cannot be prevented: But it is neceſſary to have Reſpect to the Age and Conſtitution of the Patient, to his Habit of Body, to the Seaſon of the Year, and the Nature of the Wound.

'Tis to be obſerv'd, that a very ſtrict Diet is a mighty Hindrance to the Cure of Wounds in Soldiers, who commonly feel more of the Inconveniencies of a too ſcanty, than thoſe of a too plentiful, Table. Wherefore I don't altogether deprive them of the Uſe of ſubſtantial ſolid Food, unleſs when Neceſſity requires otherwiſe, for this keeps up their Strength; for Broths, though good

good, are not ſo nouriſhing in Hoſpitals as to be ſufficient of themſelves for Food; and at the ſame Time this is no Prejudice to the neceſſary *Diverſions*. Wine alſo a little allayed ought not to be kept from them, unleſs in ſome very important Caſes: It reſiſts the ill Quality and Malignity of the Air, which is always impure in Hoſpitals; and in a Word, Wine is their Cordial and Counter-poiſon.

It is likewiſe very neceſſary, eſpecially in Hoſpitals of the Army, to have Regard to the Situation of the wounded Part, which ought to be ſuch as to give Liberty to the Circulation of the Blood, and a Deſcent to the Matter, and Eaſe to the Patient. I have known the Neglect of this Point occaſion very troubleſome Symptoms. If a Surgeon is not ſo charitable as to give Inſtructions to thoſe that attend the Wounded, how to make their Beds ſuitable to the Quality and Nature of their Wounds, the miſerable Patients are ever in Pain by the inconvenient Poſition, which is enough of it ſelf to deprive them of the Reſt that is ſo neceſſary for them, as to render their Suffering and our Cares ineffectual.

The Head ought to be placed indifferent high, and laid upon ſomething that is ſoft, without Feathers, if it may be had, with a Deſcent to promote the Diſcharge of the Matter. When the Neck is wounded, it muſt be in a Manner ſlightly ſupported by the Pillow, or by Linen folded into ſeveral Doubles; we muſt fill up the empty Space between the Head and Shoulders. Wounds of the Breaſt require an eaſy and unſtrained Poſture, rather high than low; but in this we muſt have moſt Regard to the Conveniency of the wounded Perſon. Thoſe of the Lower Belly and Loins demand almoſt the ſame Situation. To thoſe of the Bladder and Genital Parts, an undiſturbed Repoſe, a convenient Bandage, which is a *Suſpenſory*, and a Poſition ſomewhat raiſed, are very needful.

Every Body knows that the Arm, when wounded, muſt be ſupported by a Sling that paſſes over the Neck; and that in Wounds and Fractures of the Shoulder-bone, a Pillow is neceſſary to keep it almoſt as high as the Breaſt, in which Poſture it is moſt at Eaſe. In Wounds or Fractures of the *Wriſt*, *Metacarpus*, and *Fingers*, we muſt keep the Hand extended with a Piece of Board.

Wounds of the Thighs require that the Member be plac'd ſtraight, neither too high nor too low. Thoſe of the Legs and Feet do neceſſarily demand that the Part be ſomething high, that ſo the groſſer Blood may freely circulate; for otherwiſe the Blood by its Weight might be ſtop'd in the Veins, and corrupted there; and thus the Circulation being ſuppreſs'd, many grievous Accidents would enſue. It is alſo very neceſſary to ſtretch out the Legs, and keep them ſtraight during the Cure, otherwiſe it will be difficult to reſtore them to their natural Figure after it is over, eſpecially if it has been of ſome Continuance; as ſuppoſing the Leg had been kept bent when under Cure of a complicated or ſimple Fracture.

The Bandage too ſtraight, eſpecially in Gunſhot Wounds, occaſions troubleſome Accidents. It hinders the Circulation, and frequently cauſes Mortifications; wherefore I uſe only ſuch as may keep on the Dreſſings, eſpecially the firſt Days. Many have been brought wounded to the Hoſpital, with the Parts half gangren'd by too tight tying; for in Gunſhot Wounds, the wounded Members ſwell always, ſome more, ſome leſs, whereby the Bandage, though but moderately ſtraight, becomes intolerable before the next Dreſſing. Reſt alſo is of no leſs Conſequence to the Patient. Now where all theſe Things meet together, and are rightly order'd, they are commonly of very great Advantage to the Wounded.

I uſe Purgatives with great Caution, and that only after the Time of the moſt dangerous Symptoms is over, beginning always with the ſlighteſt, that only looſen, ſuch as *Caſſia*, and *Manna*, *&c.* During this Interval, Clyſters, together with the Uſe of Prunes, give no ſmall Relief. Oats and cleans'd Barley being eaſily digeſted, qualify the preternatural Heat of the Blood, and keep the Belly open. As for the Topical Remedies, which I commonly employ in dreſſing of Wounds, they have nothing ſingular in them that is not pretty well known to every Surgeon.

I avoid as much as poſſible the Uſe of putrefying Medicines, and of powerful Suppuratives,

puratives, becauſe they deſtroy the Temperament of the Parts, diſunite the Particles of the Blood, and corrupt and deprave the nutritious Juice, which ought carefully to be preſerv'd in a good Condition. 'Tis this which mov'd the Ancients ſo oft to recommend to us the Support of the wounded Parts in their natural Temper.

Hippocrates affirms, that all contuſed Wounds ought to be brought to Suppuration in order to a ſpeedy Cure, whereby he ſeems to patronize and allow the Uſe of putrefying Medicines, which commonly are employed to bring a Wound to Suppuration: But methinks this ought not to take Place in the Hoſpitals of the Army, where the Air is uſually infected by the Breath and Abode of the Sick, and which are almoſt ever encompaſs'd with the Graves of the Dead, whoſe Number is but too great.

'Tis very certain that this Nearneſs of the Place of burying, eſpecially in hot Seaſons, imparts to the Air, by the Steams that riſe from thence, a Complication of Corruption and ill Qualities, that occaſions Rottenneſs in Wounds, Alteration, and great Suppuration, and often cauſes great Mortality in the Hoſpitals and Places adjacent. Now according to this Maxim of that Author, Gunſhot Wounds muſt be dreſs'd with theſe ſame Medicines, as being of the Number of contuſed ones.

I don't abſolutely deny but there may be ſome Occaſions wherein ſuch may be uſed: However, I may be allow'd to ſay, with all the Reſpect I owe ſo celebrated an Author, that in Hoſpitals we ought to ſhun as much as poſſible putrefying and ſuppurative Remedies, and others of the like Nature, even where the Eſchar may require a conſiderable Time before its falling; for by the ſeaſonable ordering of *Diverſions*, and the Courſe of Diet, all thoſe Accidents are often prevented which the Delay of the Suppuration might cauſe; and one may without Scruple uſe, as I have done, ſuch Remedies as have a Virtue to reſiſt Corruption, as the Spirit of which *Ettmuller* preſcribes even in Gunſhot Wounds, and which I us'd at the firſt Dreſſing on the Day of the Battel of *Marſeilles*, without having obſerv'd any ill Conſequence of ſo doing; for beſides a good Method, which may be call'd the Strength and chief Inſtrument of a Workman, it is of hig Concern to underſtand and know how chuſe Remedies that agree with the Temp of the Parts to which they are applied, a to maintain them.

As there is an admirable Variety of Co ſtitutions, ſo it looks as it were neceſſary uſe different Remedies to Wounds of ſame Nature, and of the ſame Parts, in di ferent Subjects. The Sex, Age, and Seaſo muſt alſo be conſider'd. I have likewi obſerv'd in my Travels by People of diff rent Nations that have been under my Hand that divers Climates require particular A plications in certain Circumſtances neceſſa to the Cure of Wounds; for the Conſtitu tions of Men depend chiefly on the Cou tries they inhabit, on their Situation, as the Difference of Airs, Winds, Food, W ter, *&c.*

But not to ſearch any further into the Things, which cannot be contain'd with the Limits here preſcribed, and don't pr perly belong to the Subject; I will on ſay, it is eaſy enough to diſtinguiſh a pr per Remedy from one that is not ſo. Th which corrupts and depraves the natur Balſam, is known by looking into t Wound, from which, if there proceeds ſtrong and ſtinking Vapour, 'tis a Sign th the Matter is not concocted, for that i thin, blackiſh, too plentiful, watery, and an offenſive Smell.

The Fleſh likewiſe has its peculiar Sign It is dull of Feeling, and ſometimes is co vered with another proud Fleſh. Oftentim there is to be ſeen over all the Wound a cer tain black or white Filth, which ſome, as have often known, ſcrape or cut off at ever Dreſſing, whereby the Wound is enlarg and the Cure delay'd: Others imputing to the vicious Temperament and ill Diſpo ſition of the Patient's Body, have Recour to Purgatives, which occaſion ſtill more ne Accidents, ſuch as Fevers, *&c.*

But be this as it will, 'tis certain that w ought not always to delay till the laſt be fore we change the Remedy; our Smell an our Sight alone are ſufficient to direct us o this Occaſion. *Hippocrates* orders a Medici to be chang'd, when it does not what ought or was deſign'd for.

But we must not on the other Hand fall into the contrary Extremity of changing the Ointments sometimes once, and often twice every Day, not giving Time to a Remedy to act and exert its Vertue on the Part to which 'tis applied. 'Tis necessary that the wounded Part draw as it were Nourishment from the Medicine; and therefore it must have a requisite Time allow'd it for that Purpose. It must, if I may be allow'd so to speak, amalgamate with the nutritious Juice of the Part; or at least, if it don't encrease its Quantity, it ought to preserve it in the natural State, and when fallen therefrom, restore it again. To be capable of these Effects, it must be endow'd with a volatile and oily Spirit, viscous and temperate, as Balsams and Vulneraries are, which I have used with very good Success.

I have often experienc'd on many Occasions in several Hospitals, and chiefly in this, and that in very considerable Cases, that after I had in vain used many Remedies authoriz'd by Custom, the Balsam describ'd in the Sacred Writings, or the *Samaritan* Balsam, has had surprizing Effects; and that Members, at the Point of being cut off, have been thereby cur'd with much Ease. This Hospital of *Brianson* might afford many Instances of the Truth hereof; but I shall content my self with the Two following.

An Observation of a very considerable Case.

A Surgeon of this Hospital, being one of those who were employ'd in dressing the Wounded, by Accident had a Thorn run into the middle Finger of his Right Hand, which pierc'd the Tendon of the Muscle that bends it. His whole Hand and Arm were attacked with very troublesome Symptoms, accompany'd with a continual Fever extremely violent, and an insufferable Pain.

Five or Six Days pass'd before I had Notice of this Accident, and all the Symptoms were at the very worst. I found all Things in a very deplorable Condition, the Arm swell'd as big as the Leg, the Hand of a monstrous Size, and the Finger as large as the Arm. Many Cavities were in the inward Part thereof, and some in the outward, from which issued a serous Matter. There was another large *Sinus* under the *Musculus Palmaris*, with an Orifice near the Roots of the Fingers.

I immediately laid open the Finger on the inward Part from one End to the other, and found the Tendon swell'd and corrupted. I did not enlarge the Orifices on the outward Part, nor that of the Palm, hoping that all these would be well if I could but overcome the Accidents. He was let Blood, and had a Clyster given him, though somewhat too late. He observ'd an exact Course of Diet, and was dress'd with the Balsam of *Arcæus*. Next Morning when I took off the Dressings, I was surprized, as I had been the Day preceding, with a Vapour of an intolerable Smell; the Lips of the Wound were turn'd outward, which made me despair of a Cure, and judge it would be necessary to cut off the Hand. The Matter remained undigested, the Fever, the Pain and the Swelling continued as before; so I dress'd him in the same Manner as the Day before, with the Addition only of a little Spirit of Wine. The Bleeding was repeated, and also the Clyster.

The Day following the Wound was in the same Condition, only the Corruption appeared to encrease; and we were of Opinion that nothing but Amputation could save his Life: But forasmuch as Art and Reason dictate that the Preservation of the Members ought to be endeavoured as much as possible, and we are oblig'd in Conscience to try all Remedies before we come to that Extremity, I resolved forthwith to change the Medicines, judging rightly, that what had been used might have occasioned this Depravation of the Salts; whence it was to be feared a total Corruption of the nutritious Juice might follow.

With this View I used the *Samaritan* Balsam, mixed with a third Part of that of *Arcæus*. In this I wetted the Pledgets, which I applied very warm over all the Wound, and upon the *Sinus's*. I poured some of it also into the *Sinus* of the *Musculus Palmaris*, dissolved in Oil of Roses and good Vinegar.

The next Day after this we found all Things much changed for the better: The

Fever and Pain were leſſened, and there was nothing ſo ill a Smell as before. I queſtion not but the Fever is a Symptom troubleſome enough, and able to cauſe all theſe Effects; and that by the Motion it excites in the Blood, it ſeparates ſaline and ſulphureous Juices, that by irritating the Fibres, may occaſion that turning out of the Lips of the Wound, their Swelling, and that inſupportable Smell: But it can't on the other Side be denied, that outward Remedies contribute much to procure that Fermentation and Corruption in the wounded Part, when they are ſuch as putrefy, becauſe they diſſolve the Blood and other Liquors, cauſing Irritations, Corruptions, and great Suppurations, and deſtroy the Temperament of the Parts to which they are applied; whereas when balſamick and ſpirituous Medicines are uſed, they produce quite contrary Effects; for by allaying the Sharpneſs of the Humours, and making the Blood fluid, they reſiſt Corruption, dry up the Moiſture, and in the Place where they are apply'd by the Fever.

In fine, whether it was by this or any other Way, 'tis certain that the Change of the Medicine here produced a notable Alteration on our Patient; for though the Fever appeared but very little abated by all that I had formerly done, the very next Day after this the Lips begun to come nearer together, the Pain and Defluxion ceaſed, and which is moſt of all, the ill Smell was quite gone; ſo that in Five or Six Days he was paſt all Danger, and the Cure was compleated in a little Time after.

Mr. *Le Clerk*, Phyſician to the *French* King, in his Compleat Surgery commends much the *Samaritan Balſam*, to which we have given the Title of the *Balſam of the Holy Scriptures*; and the Approbation of ſuch a Man is ſufficient to juſtify its Uſe: So I reckon 'twill not be improper to ſubjoin here the Deſcription of another compound *Samaritan Balſam*, of an admirable Vertue. It is made up of equal Parts of *Spaniſh* Wine and Oil of Roſes, to each Pound of which Mixture add Two Ounces of Sugar Candy, and as much Honey of Violets; boil all on a gentle Fire, and skim it, till the Wine is conſumed. This may be called the *Balſam* of *Balſams*, or the *Compound Samaritan*.

An Obſervation of another Caſe.

MR. *Vert* the younger, an Enſign of the Company of Mr. *Beauvet*, Lieutenant of the King at *Brianſon*, and Commander of the Second Battalion of *Sault*, had no leſs Reaſon to applaud my Method, and the good Effects of my Remedy, than the Perſon we diſcourſed of in the preceding Chapter.

He was wounded with a Sword at *Prageſlas* in the outward Part of the Left Arm, near the bending of the Elbow. The Wound was at firſt neglected, being not well dreſs'd; for without dilating it at all, a Tent was thruſt into it as long as it could poſſibly receive, which occaſion'd ſuch frightful Accidents, that the Patient thought of nothing but loſing both his Arm and his Life. In the inward Part of the Arm, oppoſite to the Wound, Matter was collected, and Abſceſſes formed, which obliged him to conſult the principal Surgeons of the Regiments, who thought it convenient to make an Opening in that Part, which accordingly was done. By the large and deep Inciſions that were made, the Artery was opened, ſo that they were obliged to uſe the *Actual Cautery* to ſtop the Bleeding; by this Means the Wound was enlarged, and the Pain and the Accidents encreaſed.

The firſt Wound was ſtill dreſſed as before with Tents; but the wounded Perſon having kept his Bed for Fifty Days, and his Wounds being ſtill in a very wretched Condition, he was adviſed by the abovementioned Gentleman Mr. *Beauvet* to cauſe himſelf to be carried to *Brianſon*, to try if he could find any Help in that Place. Accordingly he was committed to my Care, and I found the inward or lower Wound the Length of a large Span, and Four or Five Fingers Breadth wide; the Artery and Tendon were uncovered; the firſt or outward Wound, whoſe Orifice was very ſtraight, had in it a pretty long Tent, which ſhut up the Paſſage of Three or Four *Sinus's*, that took up all the Joint.

The Arm and Hand were œdematous, being much ſwelled and painful. I began by making an Inciſion in the Wound on the outward Part, whereby I diſcover'd the Orifice

fices of the *Sinus's*, into which I drop'd a little of our Balſam, mix'd as I formerly ſaid, with ſome of that of *Arcæus*.

The large and lower Wound was dreſs'd with the ſame Remedy; we us'd expulſive Compreſſes, to preſs together the Sides of the Cavities, which we kept on with a proper Bandage; and withal we laid aſide the Aromatick Wines, that had been us'd before upon all the Part, to his great Detriment.

Three Days after it had been dreſs'd in this Manner, the moſt Part of Accidents diſappear'd; he began to riſe up from his Bed, to take his Victuals, and to gather his Strength; all the deep Cavities were fill'd up; the Artery, the Nerve and the Tendons were cover'd over: The Pain, the Fluxion, and the Oedematous Swelling were quite gone, and by this powerful Incarnative, the Cure was compleated in a Fortnight, with the Aſſiſtance of a little *Unguentum Apoſtolorum*, wherewith we ſometimes uſe to conſume the Fleſh; after this he mounted his Horſe, and went for the Air into his own Country.

This I may confidently affirm, as a certain Truth, that when the Balſam we ſpeak of is genuine and unſophiſticated, it may ſerve at the ſame Time both for Food and Medicine, being made up only of ſweet Oil and Wine: And that it may be us'd not only for airing Wounds of the Mouth, of the Tongue, of the Gullet and Windpipe, and generally of all the Breaſt; but likewiſe in obſtinate *Dyſenteries*, in Relaxations of the Fibres of the Ventricle, in Ulcers thereof, and in thoſe of the Guts, and of all the lower Belly: For if we conſider its Nature, we ſhall find it of a friendly Quality, and extreamly agreeable to our Conſtitution; as being compounded of ſuch Things as ſerve us daily for Food. Sweet Oil ſoftens, looſens, ſweetens and penetrates; and when it is boil'd with Wine, which it devours, as it were, and conſumes, retaining with it ſelf all the Vertue thereof, it is enabled to perform all thoſe Operations with much more Eaſe: It cuts, diſſolves, ſtrengthens, reſtores the Spirits, breeds Fleſh, and is aſtringent; all which our Balſam performs, being indow'd with the moſt uſeful Vertues of theſe Remedies, and containing a volatile, oily and temperate Salt, that is aſtringent and ſarcotick; and if a little Sugar is boil'd with it, it becomes yet more excellent, is more Vulnerary and Balſamick, has no Acrimony, and is without either Smell or Taſt.

Had this Remedy, how ſimple ſoever it may appear, produc'd ſuch Effects in the Hands of any other but my ſelf, they wou'd without Queſtion have made a great Secret of its Compoſition; and tho' this had been known to many, yet they wou'd never have publiſh'd its Vertues.

It were mightily to be wiſh'd, that there were only one Remedy, which might be able to anſwer all Intentions; then we ſhou'd not be always oblig'd to have in the Patient's Chamber a whole Apothecary's Shop; which is often no leſs prejudicial to the Purſe, than offenſive to the Smell.

Being about ſix Years ago at *Turin*, I cured a Gentleman of an inveterate Ulcer that encompaſs'd all the Bottom of the *Uvula*: Many Surgeons had to no Purpoſe us'd a great many Remedies; and I in like Manner, after the Uſe of ſome more with no better Succeſs, bethought my ſelf at length of my Anodine Balſam, in this I dip'd a Linnen Rag, ty'd to the End of a Probe, and therewith touch'd the Ulcer twice a Day: By this Means, as I ſolemnly proteſt, in twelve or fifteen Days the Ulcer was compleatly cur'd. This Remedy, how ancient ſoever it is, will appear new to many. However, 'tis certain that *Hippocrates*, in complicated Fractures, us'd little Linnen Rags dip'd in Oil and Wine mix'd together, to allay the Pain, and prevent Convulſions, which is a Precedent ſufficient to invite our Imitation.

It hath been the Policy of almoſt all who ever wrote of Medicines, ſtill to reſerve ſomething undiſcover'd to themſelves. I could name a great Number of Authors, who have publiſh'd the Vertues of certain Remedies, whereof they have never given the Compoſition; or if they have, it has been in ſuch ambiguous and ænigmatical Terms, that it is hard to underſtand any Thing of it. And indeed I muſt acknowledge, that a Remedy, when it becomes Common, how good ſoever it may be, loſes much of its Eſteem.

I have formerly ſaid, that the Variety of Conſtitutions, and Diverſity of wounded Parts, require ſometimes a Difference of Remedies; to this we muſt have all due regard, for it often falls out, that even the moſt excellent Medicines are not capable to anſwer all our Expectations, eſpecially when the Patient is of an ill Conſtitution, and the Diſtemper obſtinate and troubleſome.

However, it is not good to put too much Confidence in this ſingle Compoſition, as if it were an univerſal Remedy, leſt at any time the Succeſs prove not anſwerable to our Deſires: I own that I have been oblig'd my ſelf in ſuch Caſes to boil in our Balſam, the greater Conſound, Bugle, *Sanicle*, ſome Lavender, Clary, St. *John*'s Wort, and the leſſer Woon-Wort, which is a powerful Vulnerary, and very common in theſe Parts; and afterwards to give it ſome Conſiſtence with about a third Part of the Balſam of *Arcæus*. This Compoſition has done ſurprizing Things; it hath conſum'd and remov'd *Fungus's* from Feet that had been entirely Frozen, and alſo from *Amputations*, which had withſtood all other Remedies; it procures a good and moderate *Suppuration*, eaſes the Pains of Wounds in the Nerves, allays and reſolves powerfully, fills up with Fleſh in a ſmall Time, and in fine an *Embrocation* therewith, cures ſpeedily Bruiſes of all Sorts.

Tho' I have a great Eſteem for theſe Remedies, and am confirm'd in my Opinion of their Excellencies by a Multitude of Experiments that I have had; yet I don't pretend to lay aſide the Ointments, Cerats and Plaiſters of Pharmacy, which may be of very great Uſe, and are every Day employ'd with Succeſs, by very skilful Perſons in curing of Wounds. This I will only affirm by the Way, that the greateſt ſhare of Ointments have a ſtrong Smell, that is not only diſagreeable, but is alſo no leſs hurtful to the Wounds than offenſive to the Smell, and tends very much to render them putrid, ſanious and virulent.

There are alſo ſeveral Places, where they unadviſedly uſe *Corroſive Sublimate*, *Arſenick*, and other Things of the like Nature; in the Cure of Wounds, not foreſeeing their fatal Effects. But in this Point we can't be too cautious; all the Parts of our Body are mad up of Veins, Arteries, Nerves, Lymphatic Veſſels and Glands that are eaſily affected b whatever touches, and by Means of the Cir culation convey to the large Veſſels, an the Original of the Nerves, the good or i Qualities that are imparted to them. Th Contagion that is communicated to th Sheets of a Bed, wherein one that has th *Pox* or *Itch* has lain for a Night only, wil imprint its Characters on a ſound Perſo that afterwards lies in 'em, tho' the impur Matter touch only the ſcarf Skin, and is t Appearance much leſs active than *Arſenic* or *Sublimate*. The Unfaithfulneſs us'd i making up certain Compoſitions, which have experienc'd on ſome Occaſions, hat oblig'd me to reſolve to make up my ſe ſome that are more ſimple, and much mor effectual.

Ettmuller in his Medicinal Surgery, an many others before him, have complain'd of the prodigious Number of Medicine us'd in Practice, and of the great man Plaiſters, Ointments, Cerats, and a Thou ſand other uſeleſs Things, good for nothin but to perplex the Mind of young Surgeons This great Magazine of Pharmacy, migh be reduc'd to much narrower Bounds: Ex perience has convinc'd me of the Truth o this, and there are at this Time many Per ſons very expert in Surgery, that are here of my Opinion; ſome of whom think, tha one Remedy only may anſwer all. It wer well if ſuch a Method could be found ou for the Good of the Wounded, and th Convenience of the Surgeon; but I am in clin'd to think that no Man has yet gain that Point, which is extreamly hard to b attain'd, becauſe of the Diverſity of th Parts of which we are compos'd, and th Variety of Conſtitutions in different Per ſons. 'Tis this Conſideration, that hinde me from giving Credit to that univerſ Remedy which ſome have endeavour'd t eſtabliſh: But if I am not altogether of th Opinion, I am yet much farther from th of the Ancients, who have left us ſuch numerous Liſt of Remedies, as can't be eith committed to the Memory, or retain'd there A great deal of Study and diligent Applic tion is neceſſarily requir'd, in order to kno their Vertues and Preparations, for to ma

the right Uſe of a Medicine, we muſt know its Nature and Effects, not leaving the Succeſs to uncertain Chance, and the Fidelity of another, as is often done.

Moreover, it is very hard to believe that all theſe mighty Compoſitions are anſwerable in their Effects, to the Expectations had of 'em: The numerous and differing Ingredients do oppoſe, alter and deſtroy one another. The moſt ſimple Things are moſt agreeable, and ſympathize moſt with our Nature. Balſams are recommended in the Curing of Wounds by the Ancients, and almoſt all the Moderns, contrary to the Opinion of ſome that practiſe Surgery, who being Enemies to Antiquity, act as the Quacks do, contrary to all manner of Reaſon: But an indiſcreet Paſſion, ought never to prevail over that which is juſtify'd and ſupported by Experience.

Tho' I don't approve of Medicines made up of Abundance of Ingredients, yet I have often us'd the Styptick Plaiſter of *Crollius*; which, tho' it may be accounted of this Number, ought not to be laid aſide, for when it is faithfully made up, its Vertues are too Effectual to be neglected: When I have a Mind to give it a ſofter Conſiſtence, and reduce it to the Form of an Ointment, that I may make uſe of it in dreſſing of Wounds, I melt it with the Balſam which I have deſcrib'd, and ſometimes with the Oil of St. *John*'s Wort, prepar'd with *Gum Elemy*. It will anſwer all the Expectations conceiv'd of it, in curing Wounds and Ulcers, it allays Pain, cleanſes and breeds Fleſh, and thoſe who will give themſelves the Trouble to examine into its Compoſition, will agree with me that it is not impoſſible but it may have all theſe Vertues.

I have ſometimes us'd a red Balſam, made with an Ounce of Red Sanders and White Wax, two Ounces of Venice Turpentine, Oil of Roſes and Roſe-water, and a Dram of Sal Armoniack, all mix'd together and gently boil'd and kept for Uſe; it reſiſts Putrefaction, and leſſens Suppuration. The ſimple Digeſtive, is a Remedy that I commonly uſe to bring away the Eſchar in Gun-ſhot Wounds, mixing always therewith a little of the Yolk of an Egg, and ſome Spirit of Wine: I renew it every Day, becauſe it ſoon corrupts.

Turpentine is a ſimple Balſam, which is excellent in the curing of Wounds: The Country People about *Brianſon*, who gather a great Quantity thereof from the Wood of the Larch-Tree, uſe nothing elſe but this ſingle Remedy, without any mixture, for the Cure of their Wounds. It is certain that they who are us'd to mix with it a great Number of Ingredients and *Catagmatick* Powders, ſpoil its Vertue, and can expect nothing from it but bad Succeſs.

Arcæus his *Balſam* us'd in ſo many Places, is not to be deſpis'd when rightly compos'd: But 'tis convenient to obſerve, that it agrees not to all Diſtempers, nor to all Parts of the Body, as was obſerv'd in the firſt Remark of this third Part, which I have alſo experienc'd ſince on many other Occaſions. *Baſilicon* is one of the moſt common Ointments, and moſt us'd; I ſometimes uſe it to receive Powders that I think neceſſary to irritate or procure Suppuration when I think it convenient, otherwiſe I don't much deal with it. It ſometimes falls out by the Uſe of *Sarcotick* Balſams that the Fleſh grows ſo faſt, as to oblige us to conſume it, and alſo Orifices of the Lymphatick Veſſels oftentimes raiſe up certain Protuberances, that together with the ſuperfluous Fleſh, forms as it were a Reſemblance of Muſhrooms, which ſome endeavour to remove with *Cathareticks*, but to no purpoſe.

I have obſerv'd, that to touch the Excreſſence all over with a Diſſolution of the cauſtick Stone, is much better than any other Means that can be us'd for this Intention, provided the Application be renew'd as oft as it requires; I have in eight or ten Days conſum'd Muſhrooms as big as my Fiſt, which the ordinary Powders cou'd not have done in two Months. When I only intended to bring to an Equality the luxuriant Fleſh, and procure a firm and handſome Scar, I have us'd with good Succeſs, *Unguentum Apoſtolorum*, mix'd with a little *Unguentum Ægyptiacum*; this deſtroys proud Fleſh, and is an excellent Medicine for Ulcers, to be apply'd before the Uſe of powerful *Sarcoticks*: For it quickens the Fleſh, conſumes ſuperfluous Moiſture, and reſiſts Putrefaction.

I have always approv'd of the Uſe of Spirit of Wine, and have often caus'd Wounds of the Extremities to be dreſs'd with this Remedy only: 'Tis true, it delays Suppuration, and protracts the coming away of the Slough in Gun-ſhot Wounds: But it powerfully reſiſts Putrefaction, corroborates, quickens and hinders exceſſive Suppuration, and the Diſſolution of the Nerves, in which putrefying Medicines are very hurtful. The *Emplaſtrum Tripharmacum Joberti*, made of *Litharge*, *Oil* and *Vinegar*, to which I add a little ſcrap'd Lint, is admirably good to digeſt a Wound, and bring it to Suppuration without occaſioning great Putrefaction; it mightily diſſolves Contuſions, and its Uſe is of great Service.

I have often obſerv'd, and it daily falls out, that Quacks, who have neither Skill nor Experience, have ſucceeded in the curing ſeveral Diſtempers after they were given over by profeſs'd Surgeons, who had beſtow'd much Time and many Applications to no Purpoſe; but I don't think it at all ſtrange, for thoſe leave Nature to herſelf on ſuch Occaſions; and 'tis ſhe only that works theſe Miracles, that are unjuſtly attributed to them, and give ſuch repute to their Remedies: Not but that acting without any Rule, they commit very groſs Blunders, being unable with all their Balſams to correct, overcome, or foreſee the Accidents that oftentimes follow upon Wounds: For all their Skill extends no further than to the making up of their Remedies, and that which can't be cur'd by theſe, paſſes with them for incurable. It is not ſo with regular Surgeons, they know the Cauſes of Accidents, and apply thereto the neceſſary Remedies, without abandoning the wretched Patient to this ill State.

It is indeed a notorious Shame, that a wounded Perſon ſhou'd go from under their Hands to be cur'd by a Quack or a ſilly Woman; I have known in ſeveral Places ſuch, who by the Sale of their Remedies have acquir'd great Reputation, whether by the Confidence that wounded People had of the Vertue of their Balſams, or for a Reaſon that appear'd very convincing, to wit, that tho' they neither us'd *Tents* or *Dilates*, but baniſh'd them their Practice, yet they often ſucceeded in their Cures to the Diſgrace of Surgery. However, it muſt needs be, th the Inventors of theſe Balſams did diſcov ſome Inconveniencies in the Uſe of Ten ſince they have altogether forbidden to u 'em: Now I ſuppoſe it will eaſily be b liev'd, that thoſe Men or Women who a imploy'd in ſelling them, are not the fi Authors, and that thoſe who firſt inven ed them were not altogether deſtitute Knowledge.

Diapalma is one of the Plaiſters moſt co monly us'd in the Hoſpitals of the Arm When it is rightly made up and diſſolv as was ſaid before, it is not to be deſpis and I add to it, when the Caſe requires, little *Betony Plaiſter*, *Emplaſtrum Divin Manus Dei*, *&c.* are Plaiſters of a ſingu Vertue, but ſeldom found to be made with the Fidelity required in their Compo ſitions. I have nothing in particular to ſa concerning Cataplaſms, according to th ordinary Method, it belongs to the pr dent Surgeon to give them what Form a Qualities he thinks fitteſt for the preſent O caſion.

I have often found much more Advanta from the Uſe of *Emplaſtrum Tripharmac* I have ſpoken of before, and *Diapalma* di ſolv'd, which don't ſo much clog the Par to which they are applied, nor hinder Tran piration. Anodine Cataplaſms, ſuch that of Bread Crums, and others of th Nature, are very uſeful in great Inflamma tions of Wounds, after the neceſſary Dive ſions have been perform'd; they allay th Heat of the Blood, extinguiſh the Acrim ny of Salts, and relax the Skin. *Ointment Sanders* may likewiſe be uſed to good Pur poſe: And when the Pain is partly remov I then uſe diſſolving Medicines; which firſt might have encreas'd the Inflammatio and Fermentation.

Before I put an End to this Diſcourſe, muſt remark, that it is very requiſite for Surgeon of a Field Hoſpital, or of an Arm who may ſometimes be ſhut up in a b ſieg'd Place, ill furniſh'd with Medicin for the uſe of the Wounded, to underſtan how to make up ſimple and eaſy Remedi with few Things, ſuch as thoſe before men tion'd for Wounds, and theſe which I ſha hereafter ſpeak of for Ulcers, which in tim of Need may ſerve for all. *Brandy*, whic

the common Refuge, inſtead of other Remedies, may alſo be wanting, it is the part of a prudent Surgeon wiſely to provide for this Neceſſity, and to accommodate himſelf to the Time, by dreſſing the Wounded ſeldom, and according to our Method. Thus fewer Medicines will be us'd, a little will go a great Way, and every one have Reaſon to be ſatisfied.

A great Number of Abſceſſes, Wounds, Ulcers and Fractures. Of all Sorts that have been under our Hands in this Hoſpital were cur'd according to this Method, wherein there is nothing but what is gentle and eaſy. All the Amputations that were perform'd, were dreſs'd only once in two or three Days, during the whole Time of the Cure, with our ſimple Remedies, and that with very good Succeſs. Thoſe who have been ſo happy as to avoid the malignant Influence of the contagious Steams, that have ſo long prevail'd in the Air, have experienc'd the Comfortableneſs of this Method by the Suddenneſs of the Cure, compleated without any Exfoliation of the Extremities of the Bones, which infallibly had follow'd on *frequent Dreſſings*.

I commonly uſe a Button of Vitriol, to cauteriſe the Veſſels and ſtop the Bleeding, which I ever found ſucceſsful; neither did the Flux of Blood ever return. The two Stitches with the Needle, made croſswiſe upon the Vein or Artery, are very ſure; this is a common Way, which I have ſometimes, and ſtill do follow: But the falling of that *Suture* is ſometimes ſo tedious, that it wearies out the Patience both of the wounded Perſon and the Surgeon; tho' after all, its Uſe is very ſafe, for the Bleeding is leſs to be fear'd this Way, which is quick and gentle, than any other. The actual Cautery is now out of Uſe, unleſs it be in Amputation perform'd on the Dead.

Had not Charity and Patience prevail'd in this Place, and reſtrain'd us from cutting off, without further Delay, Members that were only gangren'd by an Extremity of Cold, as other Surgeons of Hoſpitals have done, this of *Brianſon* wou'd have been full of Invalids. For about the End of the Campaign 1692 and 1693, a great Number of ſick Perſons who went thither from *Pignerol* and *Oulx*, were ſeis'd in ſuch Manner, and penetrated with the Cold in the Extremities of the Body, that a total Loſs of Senſe, and alſo a Gangrene did enſue, the moſt Part of whom were nevertheleſs cur'd without Amputation; thoſe only excepted that had been before worn out with long Sickneſs.

Of Gun-ſhot Wounds. From the ſame Author.

SInce Wounds are the principal Subject here aim'd at, 'tis not proper that thoſe inflicted by *Fire-Arms* ſhould be forgotten: Wherefore I ſhall ſay ſomething of them. *Gun-ſhot Wounds* are acknowledg'd by all to be very troubleſome, becauſe of the *Tearing* and the Diſordering the Fleſh occaſion'd by the Bullet, the Stop put to the Circulation ſo far as they reach, the Havock that attends them, and the Obſtructions they Occaſion; all which are but too able to produce very grievous Accidents, Fluxions, Mortifications: Gangrenes are here very much to be fear'd, to prevent which, I at firſt give Breathing to the Wound, with pretty large and deep Inciſions, according as the Nature of the Part, and Bigneſs of the Wound, do require. I do my utmoſt to draw out the extraneous Bodies, if there are any, putting the wounded Perſon in the ſame Poſture wherein he receiv'd the Wound: Afterwards I dreſs it according to my Method, and ſeaſonably perform the requiſite *Diverſions*. A Flux of Blood is almoſt never to be fear'd, till the *Eſchar* be fallen, unleſs ſome great Veſſel be wounded: Nevertheleſs I can truly affirm, that there never happen'd to me any Flux of Blood in Gun-ſhot Wounds, ſince I laid aſide the Uſe of Tents; for, according as the Eſchar is diſſolv'd and comes away, a new Fleſh is bred without any Hindrance, and covers the wounded Veſſels, which can't be when it is preſs'd with Tents. This is a Truth ſo evident, that I hope no Man will call it in queſtion.

Diet ought always to be rightly order'd: And if, notwithſtanding all our Care and Precaution, dangerous Symptoms do follow, we muſt endeavour to eaſe and relieve the Part, by making many Scarifications thereon,

thereon, in order to give a Vent to the extravaſated Blood, and to hinder its Stay and Fermentation: But conſidering that moſt of the Accidents that happen are more or leſs troubleſome, according to the different Bigneſs of the *Contuſion*, I do what I can to diſſolve it as ſoon as poſſible, and to reſtore the Humours to their uſual Motion; for according to our Definition of it, a Contuſion is a Diſorder of the Fibres and little Veſſels, that changes the Regularity and Situation of the Pores: But this is often accompanied with an Effuſion or Extravaſation of Blood, which preſſing upon the Veſſels, hinders the Courſe and Motion of the Humours and Spirits. The Accidents that follow in this laſt Caſe, are much more troubleſome; wherefore, without expecting the Effects of diſſolving Medicines, I forthwith have Recourſe to *Scarifications*, for Mortifications oftentimes ſurprize of a Sudden: But after all, as Things come not always to this paſs, ſo I ſometimes uſe diſſolving Medicines.

We have known a very warm Embrocation with Oil of Roſes, to which was added a little *Turpentine*, and ſome Spirit of Wine, produce exceeding good Effects: It begins the Diſſolution, relaxes the Skin, and diſpoſes the Part to receive afterwards the Impreſſion of the Plaiſters, ſuch as the *Tripharmacum* and *Diapalma* diſſolv'd as we have order'd, freſh Cow-Dung fry'd with volatile Salts, as alſo that of other Animals: The Roots of Briony infus'd in Spirit of Wine, are in this Caſe very proper: Diſſolving *Cataplaſms* are ſometimes very ſeaſonable, provided they be not too Emplaſtick: And if, in ſpite of all our Care, a Gangrene ſhou'd follow, we muſt uſe the Remedies which were deſcrib'd under that Head. But this Accident never yet fell out in any of the Wounds whereof we had the firſt Dreſſing; and I can aver, that tho' ſimple *Gun-ſhot Wounds* are dreſs'd in this Hoſpital as Excoriations only, yet they are always cur'd with a ſurpriſing Quickneſs: We however ſtill perform all the neceſſary Diverſions.

Of Burnings. From the ſame Auth

THE Accidents occaſion'd by *Gun-P der*, might afford us Subject of m Diſcourſe upon *Burnings*; but I deſign o to ſpeak a Word or two of 'em, that I m thence have Occaſion to point forth the medies I uſe in their Cure.

The Tallow of which they make Cand melted with the Oil of *Walnuts* to the Co ſiſtence of an Ointment, will anſwer to the Intentions propos'd in this Matter. have not found any Thing either ſo effec al or ſo eaſy, it will terminate the *Empy* and cures generally all ſorts of Burns wh ever in very ſhort Time. In fine, this the Remedy which we ordinarily uſe. *Be jamin*, *Unguentum Populeon*, and the Yolks Eggs, may be us'd when this can't be h There are but few Surgeons who have n always ſome particular Remedy for Bur ings, ſome more, ſome leſs effectual. *E muller* and other Authors have given a gre many very good ones: And Mr. *Verdue* plains their Nature and their Differences, a very clear and intelligible Way.

A little Time after the Declaration War, an Accident happen'd in the Valle of *Lucerne*, which afforded us many fright ful Spectacles: The Guard-Houſe of t Fort of *Tour* call'd St. *Maries*, fell dow upon about Thirty Soldiers as they we warming themſelves, of whom Twenty thereabouts were buried with the Ruins i the Chimney. A good deal of Time wa ſpent before they cou'd clear away the Ston and the Rubbiſh, and get out theſe poo wretched Creatures. Some were found dea and roaſted, others were brought into th Hoſpital at *Lucerne*. A Plaiſter as big as Bed-Sheet was ſcarcely ſufficient to dre them: Two or three dy'd, and five or ſi were cured by the Aſſiſtance of Cordial Diaphoreticks and other Medicines taken in wardly to facilitate the Opening of Obſtru ctions; while outwardly the moſt proper Ointments were us'd to allay the Pain, an diſſipate the corrupt Matter, to which cauſe to be added a little Camphire an ſome Yolks of Eggs. To conclude, afte very frightful Suppurations, the Cure wa

npleated, but they were for the moſt
, like ſo many Serpents, all oblig'd to
and change their Skins.

Gun-ſhot Wounds. *From Mr.* Le Clerk, *Phyſician to the* French *King.*

In theſe Wounds there is always Contuſion, Laceration with Loſs of Subſtance, often the Fracture and Shattering of the ne. They are red, black, livid and am'd, not being uſually accompany'd h an Hæmorrhage; they are generally nd and ſtraiter at their Entrance than at r Bottom, at leaſt if they were not le with Croſs-bar Shot, or Quarter-ces.

When theſe Wounds penetrate into the ſtance of the Brain or ſpinal Marrow, nto the Heart, *Pericardium*, great Veſſels, other noble Parts, Death always inevily follows, and often happens at the veInſtant. But one may undertake the re of thoſe that are ſuperficial, and ich are made in the Neck, Shoulders, ns, and all other Parts of the Body.

For the better curing of theſe ſorts of unds, it is requiſite to be inform'd of Quality of the Fire-Arms, by which the unds were made, in regard that a Muſt is more dangerous than a Piſtol, and a non much more than a Muſket; as alſo examine their Situation and concomitant idents; for by how much the more plicated they are, ſo much the greater e Danger. Then the Patient muſt be as near as can be, in the very ſame Sition and Poſture wherein he was when Wound was received, in order to diſcothe direct Paſſage of the Wound by the of the Probe, with which a Search is e made, whether a Bullet, or any other aneous Bodies, as Wood, Flocks, Lin, or Stuff, as yet ſtick in the Wound; hat Endeavours may be us'd to take them through the ſame Hole where they are r'd, Care being more eſpecially had to id making Dilacerations in drawing n out: But if the Operator hath endear'd to no Purpoſe to remove theſe extraus Bodies, let him make a Counter-Opening in the oppoſite Part, where he ſhall perceive any Hardneſs, nevertheleſs without touching the Veſſels. Thus the Inciſion being made, he may readily draw them out with his Fingers, or ſome other Inſtrument.

If a Bullet is lodg'd ſo far in a Bone that it can't be taken away without breaking the ſame Bone, it is more expedient to let it lie there: But if the Leg or Arm-Bones are very much ſplit or ſhatter'd, then the Amputation of 'em becomes abſolutely neceſſary. The Pain and Inflammation of the Part may be aſſwag'd by letting Blood, topical Anodines, cooling Clyſters, and Purgatives; but in caſe much Blood hath been already loſt, Phlebotomy muſt be omitted. The Clyſters may be made with Decoctions of Mercury, Mallows, Beets, a Handful of Barley, and Honey of Roſes.

Some Surgeons are of Opinion, that the Patient ought to be purged every other Day, and even on the very ſame Day that he received the Wound, if his Strength will permit. However, very gentle Purges are to be uſed upon this Occaſion, ſuch as Caſſia, Manna, Tamarinds, Syrup of Violets, and that of Roſes.

In the Mean while, Anodines may be us'd to mitigate the Pain; as Cataplaſms, or Pulteſſes made with White-bread Crumbs, Milk, Saffron, the Yolk of an Egg, and Oil of Roſes apply'd hot; which laſt Ingredient is of it ſelf a very good Anodine: But to aſſwage great Inflammations, Oil of Roſes, the White of an Egg and Vinegar, beaten all together, may be laid on the neighbouring Parts. At firſt it is neceſſary to apply ſpirituous Medicines to the Wound, and Pledgets ſteep'd in Spirit of Wine camphorated, are admirable for that Purpoſe; but if there be a Flux of Blood, Styptick-Waters and other aſtringent Remedies may be uſed ſtill, remembring that all theſe Medicaments muſt be apply'd hot.

To promote the Suppuration of theſe contus'd Wounds, a Digeſtive may be made of Oil of Roſes, the Yolk of an Egg, and Venice-Turpentine. If the Wound be in the Nerves, Tendons, or other nervous Parts, it is requiſite to uſe ſpirituous and drying Medicines, never applying any Ointments, which will not fail to cauſe Putrefaction in

thoſe

thoſe Parts: But a Cataplaſm may be made with Barley-Meal, *Orobus*, *Lupius* and Lentils boil'd in Claret, adding ſome Oil of St. *John*'s Wort.

The Balſam of *Peru*, Oil of Turpentine diſtill'd, Oil of Wax, Oil of Lavender, Oil of Bricks, Oil of Bays, Balſam of St. *John*'s Wort, Spirit of Wine, and Gum-Elemi, are excellent Medicaments for the Nerves: Or take four Ounces of Ointment of Marſh-Mallows, with a Dram and half of Chymical Oil of Bays; mix and apply it: Or elſe, take an Ounce of Oil of Turpentine, a Dram of Spirit of Wine, and half an Ounce of Camphire; mix and drop into the Wound: Or take a Scruple of Euphorbium, half an Ounce of Colophonia, and a little Wax; let 'em be mix'd together, and apply'd hot to the nervous Parts.

If the Wounds are deep, Injections may be made with this vulnerary Water, which is very good for all ſorts of Contuſions: As alſo for the Gangrene and Ulcers, take the leſſer Sage, the greater Comfry and Mugwort, of each four Handfuls; Plantane, Tobacco, Meadow-ſweet, Betony, Agrimony, Vervain, St. *John*'s Wort, and Wormwood, of each three Handfuls; Fennel, Pilewort, Bugle, Sanicle, Mouſe-ear, the leſſer Daſie, the leſſer Centaury and All-heal, of each three Handfuls; three Ounces of Round Birthwort, and two Ounces of Long: Let the whole Compoſition be digeſted during Thirty Hours in two Gallons of good White-Wine, and afterwards diſtill'd in *Balneo Mariæ*, till one third Part be conſumed.

If a Gangrene happens in the Part, Spirit of Motherwort may be apply'd to it, which is made with two Drams of Maſtick, Myrrh, Alibanum and Amber, and a Quart of rectify'd Wine, the whole being diſtill'd. This Fomentation may be apply'd very hot to good Purpoſe, *viz.* an equal Quantity of camphorated Wine and Lime-water, with three Drams of Camphire. This is alſo an excellent Cataplaſm: Take a Pint of Lye, and as much Spirit of Wine, half a Handful of Rue, Sage, Scordium and Wormwood, a Dram of each of the Roots of both Sorts of Birthwort, and two Drams of Sal Armoniack: Let the whole Compoſition be boil'd till a third Part be conſum'd, adding half a Dram of Myrrh and Aloes, and a [illegible] tle Brandy.

Of a Burn made by Gun-Powder. From the ſame Author.

IF the Burn be recent, and the Skin not [illegible] ulcerated, Spirit of Wine or Brandy is [illegible] be immediately apply'd, or elſe an Oi[illegible] ment may be made with Oil of Olives, [illegible] Bitter Almonds, Salt, the Juice of Oni[illegible] and Verjuice. If the Skin be ulcerated, a [illegible] little Bladders or Puſtules ariſe, an Oi[illegible] ment may be compounded with the ſeco[illegible] or inner Bark of Elder boil'd in Oil [illegible] Olives. After it hath been ſtrained, a[illegible] two Parts of Ceruſs, and one of bu[illegible] Lead, with as much Litharge, ſtirr'd ab[illegible] in a leaden Mortar, as will make a Li[illegible] ment. But it is not convenient to take [illegible] the Grains of Powder that remain in [illegible] Skin, becauſe they are apt to break, and [illegible] be more confounded or ſpread abroad, [illegible] that they muſt be left to come forth in [illegible] Suppuration. When the Wound is ſupe[illegible] cial, and the Skin as yet whole, poun[illegible] Onions with common Honey are an ex[illegible] lent Remedy; but if the Skin be torn, [illegible] not to be us'd, by reaſon that the Pain wo[illegible] be too great, in which Caſe, Oil of T[illegible] tar *per Deliquium*, hath a very good Effe[illegible]

If the Burn be accompany'd with a Fe[illegible] it may be allay'd with fix'd Nitre prep[illegible] with Antimony, and Gun-Powder ta[illegible] inwardly, which are very Effectual in t[illegible] Operation. Crabs Eyes prepar'd, and e[illegible] ſome of them unprepar'd, are in like m[illegible] ner admirable Remedies. As for exter[illegible] Medicaments, when the Burn is only ſup[illegible] ficial, take Onions and unſlack'd Li[illegible] quench'd in a Decoction of Rapes, and [illegible] ply this Liquor very hot, with double C[illegible] preſſes dip'd therein. Or elſe take w[illegible] Quantity you pleaſe of Quick-Lime w[illegible] waſh'd, and beat it in a leaden Mor[illegible] with *May*-Butter without Salt, to make [illegible] Ointment, which may be laid altogether [illegible] quid upon the affected Part: Or elſe, t[illegible] as much Quick-Lime as you can get up [illegible] tween your Fingers at two ſeveral Ti[illegible] Milk-Cream and clarify'd Honey, of [illegible] about half the like Quantity; let the wh[illegible]

be intermix'd to the Conſiſtence of an Ointment and applied: It is an excellent Remedy, the following one is incomparable; take unſlack'd Lime and put it into common Water, ſo as the Water may riſe four or five Fingers breadth above it. After the Effervescence, pour in Oil of Roſes; whereupon the whole Maſs will be coagulated in form of Butter, and may be apply'd.

A good Lotion may be prepar'd with the Juice of Garlick and Onions, in recent Burns: Or make uſe of this Ointment; Take an Ounce and an half of raw Onions, Salt, and Venice-Soap, of each half an Ounce; mingle the whole Compoſition in a Mortar, pouring upon it a ſufficient Quantity of Oil of Roſes; or elſe diſſolve Minium or Litharge in Vinegar, filtrate this Liquor, and add thereto a Quantity of Rape-Oil newly drawn off, ſufficient to give it the Conſiſtence of a liquid Liniment, then ſtir it about in a leaden Mortar, till it become of a Grey Colour, and keep it for Uſe as an excellent Liniment: Or, pound Crey-Fiſh, or Crabs alive, in a Mortar to get the Blood, and foment the Part with it hot; it is a good Remedy: Otherwiſe intermix the pounded Crabs with *May* Butter unſalted, and let them be boil'd up together and ſcumm'd, till a red Ointment be made, which may be drawn off and ſtrain'd for Uſe. And indeed, all medicinal Compoſitions wherein Crabs are an Ingredient, are true ſpecificks againſt Burns made by Gun-Powder.

The Mucilages of the Seeds of *Pſyllium*, or rather thoſe of Quince-Seeds, prepar'd with Frogs-Spawn, and a little Sugar of Lead, ſpread with a Feather upon the affected Part, hath a wonderful Operation in Burns. A Medicament compounded with one third Part of the Oil of Olives, and two of the Whites of Eggs, well beaten and mix'd together, is a very ſimple and ſingular Remedy: Otherwiſe, take half an Ounce of Linſeed-Oil infus'd in Roſe-water, with four Yolks of Eggs; beat them together, and let the Whole be apply'd to the burnt Part. If the Burn be very violent, and hath many Puſtules, *Etmuller* is of Opinion that they ought to be open'd, and that an Ointment ſhou'd be apply'd, which is made of Hens-dung boil'd in freſh Butter: Otherwiſe, take a Handful of freſh Sage-Leaves, two Handfuls of Plantane, ſix Ounces of freſh Butter without Salt, three Ounces of Pullets-Dung newly voided, and the whilſt that can be found, then fry the whole Compoſition for a quarter of an Hour; ſqueeze it out, and keep it for Uſe: Or take two Ounces of ſweet Apples roaſted under Embers, Barley Meal, and Fenugreek, of each half an Ounce; and half a Scruple of Saffron: Let the whole Maſs be mix'd into a Liniment or Pultiſe, which may ſerve to abate Pain and ſoften the Skin.

If the Wound be yet larger, and hath a Scab, open all the Puſtules, and endeavour the two firſt Days to cauſe the Eſchar to fall off by the Application of a Liniment made of the Mucilages of Quince-Seeds ſteep'd in Frogs-Spawn, with freſh Butter, the Oil of white Lillies, and the Yolk of an Egg; otherwiſe, make a Liniment with freſh Butter well beaten in a leaden Mortar with a Decoction of Mallows, which being ſpread upon hot Colewort Leaves, and apply'd to the *Eſchar*, will haſten its Separation.

But if the Eſchar be too hard and obſtinate, it is requiſite to proceed to Inciſions, to make way for the Sanies, leſt a deep and putrid Ulcer ſhou'd be engender'd underneath. As ſoon as the Humour is evacuated, the aforemention'd emollient Medicines may be us'd till the Separation; then the Ulcer may be conſolidated with Digeſtives and Mundificatives, ſuch as the Ointment of Quick-Lime with Oil of Roſes and the Yolks of Eggs. If a Gangrene enſues, Sudorificks muſt be taken inwardly, ſuch as camphorated Spirit of Treacle, the Eſſence and Spirit of Elder-Berries, the Spirit of Harts-horn, with its volatile Salt, Venice-Treacle in Spirit of Wine camphorated, or the diſtill'd Spirit of Scorpion's, Harts-horn, Citron with Camphore, *&c.*

As for external Remedies in the Beginning of the Gangrene, Spirit of Wine applied hot is excellent; and yet better, if Aloes, Frankincenſe and Myrrh be infuſed therein. It ought alſo to be obſerv'd, that Camphore muſt always be mingled in the topical Medicines for the Cure of a Gangrene. A Decoction of unſlack'd Lime, in which Brimſtone hath been boil'd, with *Mercurius Dulcis* and Spirit of Wine, is a very excellent

Remedy. In a conſiderable Gangrene, after having made deep Scarifications, let Horſe-Dung be boil'd in Wine, and laid upon the Part in Form of a Cataplaſm: This is an approv'd Remedy. If a *Sphacelus* be begun, ſcarify the Part, and apply thereto abundance of *Unguentum Ægyptiacum* over and above the Ointments and Cataplaſms already deſcrib'd: Remembring always, that when the *Gangrene* degenerates into a *Sphacelus*, all the mortified Parts muſt be incontinently ſeparated, or cut off from the ſound.

Of Ulcers in General. From the ſame Author.

AN *Ulcer* is a Rupture of the natural Union of the Parts, made along while ago, which is maintain'd by the *Sanies* that runs out of its Cavity; or an *Ulcer* takes its Riſe from a Wound that could not well be cur'd in its proper Time, by reaſon of the ill Quality of its *Pus*, or corrupt Matter.

The Difference between a Wound and an Ulcer conſiſts in this, That a Wound always proceeds from an external Cauſe, and an Ulcer from an internal, ſuch as Humours that fall upon a Part, or elſe a Wound by long remaining open, degenerates into an Ulcer; the Differences of them are taken from the Cauſes that produce them, and the Symptoms or Accidents with which they are accompany'd: Thus upon Account of their Cauſes, Ulcers are call'd, Benign or Malignant, Great, Little, Dangerous or Mortal; and by reaſon of their Accidents they are term'd Putrid, Corroſive, Cavernous, Fiſtulous, Cancerous, *&c.*

The putrid Ulcer is that wherein the Fleſh is ſoft and cruſty, the *Pus*, and *Ichor* being viſcous, ſtinking, and of a cadaverous Smell: The corroſive Ulcer is that which by the Acrimony and Malignity of its *Sanies* corrodes, makes hollow, corrupts and mortifies the Fleſh. The *cavernous Ulcer* is that, the Entrance of which is ſtrait, and the Bottom broad, wherein there are many Holes fill'd with malignant *Sanies* without any Colloſity or Hardneſs in its Sides.

The *Fiſtulous Ulcer* is that which hath long, ſtrait and deep Holes, with much Hardneſs in its Sides, the *Sanies* whereof ſometimes virulent, and ſometimes not. The *Cancerous Ulcer* is large, having its Lips ſwoln, hard and knotty, of a Brown Colour, with thick Veins round about, full of a livid and blackiſh Sort of Blood; in the Bottom are ſeveral round Cavities which ſtink extreamly by reaſon of the ill Quality of the *Sanies* that runs out from thence. There are alſo *Verminous*, *Pocky* and *Scorbatick Ulcers*: With thoſe call'd *Chironia* and *Telephia* and others, which have much Affinity with, and may well be reckon'd among the five Kinds already ſpecify'd.

Ulcers may be cur'd, by being well mundify'd, dry'd and cicatriz'd: But with Reſpect to the ſeveral Cauſes and Accidents that render them obſtinate and difficult to be cur'd, it is alſo requiſite to make Uſe of internal Medicines which may reſtrain and conſume them: If their Sides grow *Callous*, they are to be ſcarify'd, in order to bring them to Suppuration; and if there be any Excreſcences, they muſt be eaten away with corroding Powders, ſuch as that of Allum, or by proper Cauſticks: To this Purpoſe diverſe Sorts of Liquors may be us'd, as alſo Powder and Plaiſters: The Liquors are uſually made of *Briony* Roots, the greater Celandine, Lime, and the yellow Water, a Tincture of Myrrh, Aloes and Saffron, and Whey, whereto is added Sugar of Lead. And the *Ulcers* may be waſh'd or bath'd with theſe Liquors, and very good Injections be compounded of them.

The Powders are of Worm-eaten Oak, Allum, Cinnabar, the laſt of theſe being us'd by throwing them upon Fire, and cauſing the Fume to be convey'd to the Ulcer thro' a Tunnel; the Country People often make Uſe of Potters Earth to dry up their *Ulcers* with good Succeſs, but then they muſt not be of a malignant Nature. The Plaiſters are thoſe of Betony, Diaſulphury, *Deſiccativum Rubrum*, and others.

The Ointments are ſuch as theſe: Take three Yolks of Eggs, half an Ounce of Honey, and a Glaſs of Wine, and make them of a mundifying Ointment, according to Art. Otherwiſe, take Lime well waſh'd and dry'd ſeveral Times; let it be mix'd with Linſeed-Oil and Bole, and it will make an excellent Ointment to mundify

and dry; a little Mercury precipitate may be intermixed if you pleaſe, to augment the drying Quality; and *Mercurius dulcis* may be added in the Injections.

For *Ulcers* in the Legs, and *cancerous Ulcers*; take Plantane Water and Allum Water, or Spirit of Wine, *Unguentum Egyptiacum* and *Venice Treacle*; or elſe an Extract of the Root of Round Birthwort made in Spirit of Wine: Gunpowder alone diſſolv'd in Wine is of ſingular Uſe to waſh the *Ulcers*, and afterwards to wet the Pledgets which are to be applied to them. But here are Two particular and ſpecifick Medicines to mollify a *Cancer*:

Take Sugar of Lead, Camphore, and Soot, let them be incorporated with the Juice of Houſe-leek and Plantane in a Leaden Mortar; then make a Liniment thereof, and cover the Part affected as lightly as is poſſible to be done, as with a ſimple Flaxen Cloth, or a Sheet of Cap-paper: Or take the diſtill'd Water of rotten Apples, mingle it with the Extract of the Roots of Round Birthwort made in Spirit of Wine, reſerving this Liquor to waſh the *Part*, and to make Injections.

Of Ulcers. *From Mr.* Belloſte, *the Hoſpital Surgeon.*

Etmuller is of Opinion, that the Cauſe of Ulcers proceeds from an Acid, whereby the immediate Nouriſhment diſtributed to the Part is corrupted, and loſing its oily and balſamick Nature, becomes ſowr, and altogether unfriendly to the Part that it ought to nouriſh, and ſo conſiderably encreaſes the acid Ferment, and augments its Activity. According to this Definition, a *Topical Remedy* well accommodated to the Kind of the Diſeaſe, and that deſtroys *Acids*, and repairs the balſamick Nature of the nutritious Juice, is ſufficient to bring this Sort of Diſtemper to a perfect Cure. I have often in this Manner cured many poor afflicted Creatures, without the Uſe of general Remedies. But not to make any Change in the Manner of Dreſſing, I ſay in the firſt Place, that *Ulcers* are but too common in the Hoſpitals of the Army; the ill Diet of the Soldiers, their Irregularities, their Fatigues, and their unavoidable Naſtineſs, are more than enough to occaſion ſuch as are very obſtinate and difficult to be cured. Secondly, we have in this Hoſpital followed a Method, whereby in a little Time a great Number of Ulcers were cured; for after general Remedies, and ſome ſlight *Diverſions*, I uſed a *Decoction* of *Walnut Leaves* with a *little Sugar*; in this I dip'd Pledgets, which I applied moderately hot, letting often Three Days paſs without taking off that Dreſſing.

I know many Perſons in *France* have kept this Compoſition as a great Secret; but I thought it would be inconſiſtent with Charity not to publiſh its Vertues. I have experienc'd on a Thouſand Occaſions, that it mightily cleanſes and breeds Fleſh, mortifies and devours Acidities, reſiſts Putrefaction, plentiful Suppurations, and conſumes the Moiſture that hinders Re-union. In fine, it hath Vertues that ſurpaſs Belief, and its Effects are more quick than thoſe of all the Ointments and Ceirats with which the Apothecaries Shops are ſtor'd, and which are commonly uſed in curing of Ulcers, but often to no Purpoſe. In the mean time I dare affirm, and that truly, that in the Places where I have uſed it, all ſuch Ulcers as were formerly thought incurable, were thereby cured in a very ſhort Time.

Though I ſeldom make Uſe of *Injections*, nevertheleſs I have been ſometimes obliged to have Recourſe to this Remedy, from which I have reap'd more Advantage than all thoſe uſed in Practice, and eſpecially in hollow and deep Ulcers; as alſo in large Abſceſſes of fleſhy Parts, where there is great Putrefaction, and ſometimes a conſiderable Cavity. The *Scriptural*, or *Samaritan* Balſam, ſpoken of before, is alſo an excellent Medicine for Ulcers. With this Remedy alone I have cured great Numbers.

There are many Authors who have left us an Account of a vaſt Number of Remedies which are uſed in Hoſpitals; for which Reaſon I will ſay nothing of them here, where my Deſign is only to make known thoſe I uſe in my own Practice. By what I have ſaid of the ſeldom dreſſing of Wounds, it may be eaſily gueſs'd that I am not for frequent dreſſing of Ulcers; for if they proceed from an Acid, as *Etmuller* thinks, we

ought to endeavour not to promote the Coagulation by admitting the Acid of the Air, which, by insinuating its pointed Articles into Ulcers, corroborates the Cause, renders them putrid, sanious, and sometimes incurable.

'Tis not without good Ground that *Galen* hath ordered to dress *Ulcers* but once in Three Days; and I believe that it would be yet better to do it seldomer, unless some urgent Cause require it; such as the Season of the Year, the Badness of the Humour, or some other evil Disposition of Body. We may observe, that suppurative Medicines used in dressing *Ulcers* are extremely pernicious; for the Matter is but too plentiful, and requires to be lessen'd and dry'd up, if we desire a perfect Cure. The Application of Topical Medicines, when well chosen, oftentimes performs in this Case what neither *Diversions* nor internal Remedies could do, and of such there are good Store; but it depends only on the Prudence and Skill of him that prescribes the Use of them seasonably, for we can expect no desirable Effects either from one Kind or another, but accordingly as they are properly applied.

Unguentum Apostolorum mixed with *Egyptiacum* is not to be despised: It consumes all the corrupted and superfluous Flesh. I have often applied this before I have made Use of our *Lotion.* The *Aqua Phagædenica*, or else Lime-Water mixed with Sugar of Lead, or *Sal Armoniack*, and *Aqua Cœlestis*, have also served us on such Occasions; for if one Remedy fails, as it often falls out, we must have Recourse to another.

Of Ulcers. *From* Musitanus, Wiseman, Etmuller, *&c.*

AN *Ulcer* is agreed to be a Solution of Unity in any Part, either proceeding from an inward Cause eroding the Part, or from some external Force making a Wound, or the like, which in Process of Time degenerates into an *Ulcer*, which in *Latin* is called *Ulcus*, and *Greek* ἕλκος, from disjoining the Part it possesseth; and so in general this Term comprehends every Solution of Continuity.

Ulcers are of Two Sorts, *Simple* and *Compound.* Now I call that a *Simple Ulcer*, which hath neither a Disease, Cause nor Symptom joined to it, or complicate, besides the Solution of Unity; but in a *Compound Ulcer*, either some of these, or all, are found; in the Beginning of which the Matter is waterish and thin, in the Increase it flows more sparingly, but thicker in the full Maturation. There is no *ichorous* Matter but *Pus*, yet it looks somewhat thinner, and in the Declination laudable *Pus* appears, which is white, uniform, and without ill Smell; at which Time it is proper to dress it according to Rules of Art: First by Digestives, because the Matter which has forsaken the Vessels, and has insinuated it self within the Porosities, corrupts; wherefore it must be concocted, that it may become laudable *Pus*, and the Flesh will not generate, nor can *Sarcotick* Medicines take Place, until the Matter be ripe.

In the next Place, repelling Medicines are to be applied about the Ulcer, to repel the Matter that flows thither, to prevent Fluxion from the Parts adjacent, to strengthen them that they may resist Fluxion, and to further the Drying of the Ulcer. The digestive Medicaments are, Pitch, Rosin, Wax, Basilicon, with red Precipitate, Barley Flower, and the like: The repelling Medicines are, Juice of Quinces, Plantane, White-Wine Vinegar, Red Rose Leaves, Oil of Myrtles, Mastick, Ointment of Populeon, *Unguentum album*, seal'd Earth, Bean Flower, Plaisters of White Lead, Soap, Diapalma, *&c.* with handsome Bandage.

After these must be used mundifying or cleansing Medicines; for if we apply *Incarnatives* before the *Ulcer* is well digested and cleans'd, proud or spongy Flesh will grow in Spight of all Endeavours, and so by Consequence we cannot cicatrize or heal. The mundifying Medicines are, round and long Bithwort Root, Brass Rust, red Precipitate, Honey, Burnt Allum, Smallage Juice, *Unguentum Apostolorum*, *&c.* When the Ulcer is sufficiently cleans'd, which you may know by its appearing red, sensible of Pain, clean, and neither too dry nor too moist, then apply your *Incarnatives*, as Mastick, Myrrh, *Sarcocol*, Gum Elemi, Turpentine, Frankincense, *Olibanum*, *Arcæus*'s Liniment, *Unguentum aureum*, *&c.*

If

If a *Fungus* or ſpongy Fleſh ariſe, you muſt uſe ſtrong Deſiccatives, Cathereticks, or corrupting Medicines: For the Firſt, take Ball'd Earth, Bole, Aloes, *Crocus Martis*, Red Lead, Ceruſs, Litharge, Allum, *&c.* If theſe be not ſtrong enough, Recourſe muſt be had to ſuch Cathereticks, as Burnt Allum, Braſs Ruſt, Mercury, Precipitate, Turbith Mineral, *Unguentum Apoſtolorum* and *Egyptiacum*. If the *Fungus* be too hard and ſtubborn to yield to theſe, Eſcharoticks muſt be applied, as *Lapis infernalis*, and the lunar Cauſtick; alſo Rowal Vitriol calcin'd, Oil of Vitriol, Spirit of Nitre, and the actual Cautery, all which are attended with Pain and Difficulty, and ought never to be uſed but upon urgent Occaſions.

The *Fungus* being removed, you muſt next endeavour to cicatrize or skin the Ulcer by *Epuloticks*, as *Lemnian* Earth, Burnt Braſs, Red Lead, Ceruſs, *Unguentum deſiccativum rubrum*, the white Ointment camphorated, Lime Water, Ointment of Diapompholygos, *&c.* All Simple Ulcers become difficult or eaſy to cure according to the Nature of the Part ulcerated, and the Diet of the Patient; and the general Method is to digeſt with Baſilicon, which, if it prove foul, mix it with Red Precipitate and Burnt Allum; over this apply a Plaiſter of *Diacalceos*, and a Cloth dip'd in Plantane Water, or the Juice of any of the cooling Plants; mundify with *Unguentum Apoſtolorum*, and then cicatrize as directed before.

I have already told you, that a Compound *Ulcer* has a Diſeaſe, Cauſe or Symptom join'd with it. Now there are many Diſeaſes in Man's Body keep *Ulcers* from healing: Some corrupt the Humours, as the Leproſy and *French* Pox; ſome hinder the Blood from being ſent in ſufficient Quantities, as Conſumption, and the Hectick Fever; and ſome send too much of other Humours along with the Blood, as the Dropſy, *&c.* all which hinder the Union of the ulcerated Part. If the Humour offend in Quantity, it is to be abated by Bleeding, Purging, and under Diet; if it offend both in Quantity and Quality, we are to uſe both purging and alterative Medicines.

We ſhall here firſt treat of a *ſinuous Ulcer*, which is ſometimes ſuperficial, ſometimes deep, ſometimes ſtraight, and ſometimes oblique, *&c.* ſome of which have neither Hardneſs nor Calloſity, which are term'd *Ulcera cavernoſa*; and ſome have both Hardneſs and Calloſity, and theſe are call'd *Fiſtulæ*. The Firſt of theſe are cur'd either by injecting of proper Medicines without opening, or by opening and dreſſing them artificially. The Injections muſt be of Two Qualities, *viz.* to incarnate and agglutinate. Make an Injection of Barley Water, Honey of Roſes, Myrrh, Sarcocol, Myrtle and Sumach Berries, Roots of Tormentil, and Spirit of Wine, fitted in due Proportions, and ſtrongly boiled; to be injected warm: And if this do not cleanſe enough, uſe an Injection of Centaury, Wormwood, and Horehound, boiled in Wine, with an Addition of *Unguentum Egyptiacum* and Honey of Roſes.

To dreſs the Ulcer artificially, lay upon the whole Length of the Cavity *Emplaſtrum ad Herniam*, and then inject your Medicine; afterward put in a ſhort Leaden Pipe, having the Brims turn'd back, to keep it from ſlipping in; then ſhut up the Orifice and the Tent with a Bit of the aforeſaid Plaiſter, ſnip'd in the Middle to let out the *Quittor*: Above that place a Piece of Spunge, moiſten'd with the Medicine with which you dreſs the Ulcer, and over that place a Pledget of Tow. On the Cavity of the Ulcer lay a thick Bolſter, and over all a ſoft Linen Cloth double; then begin your Rolling at the Bottom, where it muſt be ſomething ſtraight, but not ſo as to cauſe Pain, to preſs out the *Quittor*, and cauſe Agglutination. This muſt be dreſs'd every third Day; and if you find the Matter abate, and be of a good Colour and Conſiſtence, without ill Smell, it is then an Indication that it is diſpoſed to agglutinate.

But if you find the Cavity of the *Sinus* be deeper or lower than the Orifice, Way muſt be made for the Matter to diſcharge, either by opening the lower Part of the *Sinus*, or the whole Cavity; for if one of theſe be not done, no Cure can be expected: And this Operation muſt be perform'd either by a Cauſtick or Inciſion. In applying the Cauſtick, the Situation of the Part is to be conſider'd, and the Nature of the Cauſtick. The latter Part may be done either with an Inciſion Knife and Directory, or with the

Probe Sciſſars, which is beſt, then filling it up with Doſſils to keep the Lips aſunder, and arming them with Reſtrictives, as in other Caſes. And laſt of all, if the Ulcer does not heal as you expect, give a Diet Drink made of Sarſaparilla, Guajacum, China, Agrimony, St. *John*'s Wort, Golden Rod, *Solomon*'s Seal, Comfry, Tormentil, Biſtort, and Horehound Roots, which the Patient muſt drink of for three Weeks or a Month, and keep to a ſpare Diet, and ſuch as muſt be of eaſy Digeſtion: Or let the Patient take an Ounce of Tincture of Gum *Guajacum* in Syrup of Damask Roſe Water, and then mixed with a Glaſs of Wine, in the Morning faſting, half an Hour before Dinner, and laſt at Night going to Bed. The Tincture is this: Take Spirit of Wine rectified, a Quart; Gum *Guajacum* in Powder, four Ounces; diſſolve in Balneo till the Tincture becomes reddiſh.

We have done with the *Ulcera cavernoſa*, and ſhall therefore come next to ſpeak of the *Fiſtula*, which is a ſinuous Ulcer, narrow and long, with Calloſity, and virulent ſtinking Matter, almoſt void of Pain. The Method of judging of the Courſe of the *Fiſtula* is as follows: If it paſſeth to the fleſhy Parts, the Matter appears white, ſmooth, and plentiful, and the Part where your Probe ſtops ſeems ſoft: If it paſs to a Nerve, a fat and oily Matter comes forth, the Motion which is cauſed by that Nerve is impaired, and the *Fiſtula* is more than ordinary painful, and the Bottom being touch'd by your Probe, cauſeth Pain and Numbneſs: If it paſs to the Veins and Arteries, yet ſo as their Coats be not eroded, then the *Quittor* looks like Lees of Red Wine: If it has corroded a Vein, Blood iſſues out thick, of a dark Colour, without Impetuoſity; but if an Artery be wounded, the Blood is more red, and brighter; beſides, that it comes forth with Leaping and Violence: If it has paſs'd to the Bone, and the Bone is corrupt, the Matter is yellow, of an ill Scent, and the Bone is to be felt rough and uneven.

No *Fiſtula* can be of eaſy Cure, becauſe of the Unfitneſs of the Part to receive proper Medicines. In the next Place, by reaſon the Nature of the Medicines muſt be ſuch as are ſharp and biting, and ſo produce Pain, from whence often come Fevers and Faint ings. 3. Becauſe thoſe which have many *Sinus's* require Inciſion. 4. In thoſe which terminate in Veins or Arteries, you are to encounter with *Hemorrhages*. 5. Where ſeated on the Nerves and Tendons, there is Pain and Numbneſs. 6. Where the End is more depending than the Orifice, it is hard to cure. *Fiſtula's* in the Back, if the Spine be carnous, are dangerous; likewiſe thoſe in the Joints. *Fiſtula's* of a long ſtanding in a depending remote Part, by which Nature hath been uſed to diſcharge her ſelf of Superfluities, if they are not painful, may rather be kept open than cured; for they prevent Diſeaſes, and keep the Body in Health.

The Cure of the *Fiſtula* is to be undertaken by Diet, Medicine, and manual Operation. As to the Firſt, the ſame is to be obſerved as in the Cure of an Ulcer, but more ſparingly. As to the medicinal Courſe, if a *Cacochimy* or *Plethora* abound, take for ſome Time a purging Ale or Diet Drink, compos'd of Sarſaparilla, Guajacum, Roots of Biſtort, Comfry, Tormentil, Polipody, Saxnicle, Leaves of Sena, Aniſeed, Fennel, and Liquorice; alſo you may add now and then the Electuary *Carioconſtium*, *e Succo Roſarum*, &c. After the Uſe of theſe, a conſolidative Drink of Centaury, Agrimony, Vinca, Pervinca, Golden Rod, Comfry, Plantane, Horſe-tail, and the like, which is to be drank three or four times a Day, a Pint at a time.

As to the Operation or Chirurgical Part, which is the main Intention of Cure, the *Fiſtula* is to be dilated, the *Callus* is to be removed, the Part mundify'd, Union or Conſolidation is to be procur'd, and then it is to be cicatriz'd. There are three ſeveral Ways of dilating it; by Inciſion; by Tents of Spunge, Gentian, or Elder Pith; and by the *Fiſtula Tent*.

Now if the *Fiſtula* is not deep, but has many *Sinus's*, or is *callous*, the *Sinus* is to be open'd, and the *Callus* removed, before Inciſion be made; and in order to remove the Calloſity, you muſt uſe either Medicines or the *Actual Cautery*. The Firſt Sort of Medicines to be employ'd are to be of an emollient digeſtive Quality, to be uſed, if the *Callus* be but ſmall, in a fleſhy Part; as Ointment of *Marſh-mallows*, or *Tobacco*, mix'd with

with Turbith, Mineral, or Red Precipitate. Of the Second Sort are *Unguentum Apoſtolorum*, with the aforeſaid Powders, or Burnt Allum. Of the Third Sort, to wit Cauſticks, ſome are more gentle, as *Auripigmentum*, Quick-lime, Sulphur vive, *&c.* or Verdigreaſe, Vitriol calcin'd, Burnt Allum, Turbith, Mineral, and the like, mixed in fit Proportions, which are thus to be us'd: If the *Fiſtula* is dilated by Inciſion, ſprinkle the *Callus* with ſome of theſe Powders; or if you uſe Tents, mix theſe Powders with ſome *Populeon*, and arm your Tents with it: Afterwards apply twice a Day to the Part an *anodine Cataplaſm*, and you muſt let the *Tents* remain in the *Fiſtula*, till it falls out of it ſelf, becauſe they will (ſo doing) bring the *Callus* out with them. And as to the *Actual Cautery*, it is to be uſed as ſeldom as poſſible, and with great Caution, as the Surgeon ſees moſt proper: Then mundify with Ointment of *Egyptiacum*, mixed with Brandy or Wine, and injected warm once a Day. Conſolidate or unite the Parts with a Decoction of Roots of Round Birthwort, Tormentil, Biſtort, Comfry, Centaury, Golden Rod, *Solomon's* Seal, Plantane, *&c.* very ſtrongly: Then, while it is warm, add to every Pint four Ounces of Honey, which inject hot as it can be born into the *Fiſtula*, and dreſs it as directed in the Cure of a *ſinuous Ulcer*, which you may cicatrize according to the ſame Method.

I ſhall next treat of *malignant Ulcers*; and firſt of a *Herpes exedens*, which is an *Eroſion* of the Skin, not deep, but broad, uneven, and often livid, and whilſt the Middle heals, the Brims or Lips continue ſore. In order to a Cure, the Humour which flows to the Part is to be ſtay'd, the Humour already in the Part evacuated, and convenient Applications is to be made to heal the Ulcer. The Firſt is to be perform'd by purging the Body well from groſs Humours: If the Ulcer is of a livid Colour, with lenitive Electuary, *Hiera piera*, Rubarb, Sena, and Hermodactils.

The Second is perform'd by mixing one Dram of Red Precipitate, waſhed in Roſe-water, with Ointment of *Populeon*, or the like; and this is to be uſed till the Ulcer ſpread no more, but look red. The Third, in order to perfect the Cure, is to be done by giving inwardly a Decoction of Sarſaparilla, China, and Guajacum; and if you perceive the Brims of the Ulcer to erode further and further, touch them with Oil of Vitriol; then endeavour to fill up the Cavity by Medicines which dry ſtrongly, yet are not corroſive; as Ceruſs, Prepared Tutty, Tobacco Ointment, and *Arcæus's Liniment*; or Ointment of *Enula camp.* with Mercury, one Ounce; Flower of Brimſtone, one Dram; mix them together, which is commended; and then cicatrize or skin the Sore with the red drying Ointment, call'd, *Ung. deſic. rub.*

Of a Phagedænick, *or* Eating Ulcer; *and of the* Nome.

THE *Phagedænick Ulcer* is a deep tumefied Putrefaction, yet corroding the adjacent Parts, not ſo thick as that which is the Cauſe of *Cancers*, nor ſo thin as that which cauſes an *Eryſipelas* or *Herpes*. The *Nome* ſignifies a conſuming or waſting *Ulcer*, which is without any Tumour in the Brims, but attended with Malignity, Putrefaction and Corruption of the Part.

Theſe *Ulcers* are to be cured by a good Diet, that is moderate, and affords not too plentiful a Nutrition, by frequent and reaſonable Evacuation, with proper Purgatives, and keeping the Patient to a Diet Drink of the dry Woods and vulnerary Herbs; or elſe, if the Seaſon of the Year permits, the Juices of the alterative and ſcorbutick Plants; as, Archangel, Red Nettle, Water-Creſſes, and Scurvy-graſs Juices. Dreſs the tumefy'd Brims of the *Phagedænick Ulcer* with *Unguent. alb.* and *Populeon* mix'd, and the Ulcer it ſelf with Ointment of *Tobacco*, one Ounce; and two Drams of Red Precipitate mixed. But as for the *Nome* or *Ulcus depaſcens*, it requires ſtronger Medicaments than the *Phagedæna*; as, White Vitriol, Burnt Allum, Quick-lime, Burnt Lead and Braſs, which Things are to be uſed till the Eroſion ſtops, and the Ulcers look clean and red; then incarn and cicatrize, as has been preſcribed before.

Obſervations of Phagædenick *and* Nomous *Ulcers. From Mr.* Wiſeman.

AS I was paſſing one Day thro' *Brainford* to *London*, I was deſired to ſee a poor Servant lying under an Abſceſs in his left Leg, the Criſis of a malignant Fever. The Abſceſs poſſeſs'd the Outſide of his Leg, from the Head of the *Fibula*. The Matter cou'd not diſcharge it ſelf till it overflow'd: Therefore I apply'd a Cauſtick upon the lower Part of the Tumour to give Vent to it, and left him Dreſſings till he ſhou'd be able to follow me. Some Days after he came to Town, I viſited him, and found the lower Opening diſcharg'd the Matter well, as I had deſign'd; but it was ſanious, and abounded in Quantity, more than was reaſonably to be expected from the Abſceſs. I endeavour'd to deterge it with *Paracelſus* Mundificative mix'd with Precipitate, and fomented the Part affected with a Decoction of Wormwood, Sage, Betony, Red Roſe Flowers and Myrtle-berries in Claret; then a Plaiſter of Bole, with a Compreſs wrung out of the Fomentation; rolled it up, and applied a Defenſative over the Knee to reſtrain the Fluxion: I alſo let him Blood, and purged him with an Infuſion of Sena, Rubarb, *&c.* with Syrup of Buckthorn. But finding the Ulcer would not deterge, I laid it open the whole Length; and ſeeing it ſordid, fill'd it with *Pulv. Andronis*, applying the Mundificative upon Doſſils betweenthe Lips, with an Emplaiſter of Bole over all, and rolled it up. The third Day after, I dreſs'd it again with the Mundificative as before, only adding ſome Mercury precipitate to it. This Method I continued ſome Days, rubbing the looſe Fleſh with ſome Vitriol Stone, dipping ſome of the Pledgets in Precipitate, and applying it under ſome of the Lips, where they were very hollow and troubleſome, and put on a laced Stocking. Thus I deterg'd, diſpos'd the Ulcer to incarn under the Lips and elſewhere; and that it might do ſo, I put the Patient into a Traumatick Decoction, and vomited and purged him as Occaſion offer'd: But after ſome Days, obſerving the Lips of the Ulcer did not unite with the neighbouring Fleſh, nor the Ulcer contract as I expected, I made a Search with my Probe, and found the Fleſh, which was ſeemingly good, to be ſoft, and the Lips hollow and thin, and in ſome Parts *callous*. I dreſs'd them with *Unguentum æruginis*, *Cadmiæ*, *&c.* rubb'd the callous Lips with the cauſtick Stone, and applied *Baſilicon* to haſten the Separation of the Eſchar, ſuppoſing by theſe drying Medicaments to diſpoſe the *Ulcer* to incarnate or grow up with Fleſh. But as they incarned and cicatris'd in one End or Part, the Fleſh became ſoft and rotten in another, and here and there the Lips were hollow, which I cut off, and thereby freed the Ulcer of them, and by the Help of the former *Sarcoticks* I incarned it again: But frequently in the Cicatrizing, ſome Part of the Ulcer wou'd be corroded from the Acrimony of the Humour, inſomuch that I was neceſſitated to dreſs this Ulcer with various Medicaments. In ſome Parts of it, I applied Pledgets in drying Waters, as Lime-water, and Epulotick Unguents to cicatrize it; while in ſome others I apply'd Detergents and Digeſtives too; and was not wanting at the ſame Time with Mercurials and good Diet to temper and abate the Acrimony in the Blood; yet it was a hard and difficult Task. My Kinſman *James Wiſeman* was my Aſſiſtant in the Dreſſing of him, and ſaw this Ulcer with much ado cured: But the Patient continued the Uſe of a laced Stocking ſome time after.

Such an ill condition'd *Ulcer* affected the Thigh of a Gentleman of about Fifty Years of Age, of a full Body; it was the *Criſis* of a malignant *Fever*. Dr. *Wederbourn* was the Phyſician; the Ulcer was of the Compaſs of a Five-Shilling Piece, but lay only in the Skin, extreamly Corroſive, with Lips ſtanding ſtiff up round the Ulcer: And altho' I took them down with Cauſticks, yet they aroſe again in the ſame Form, and being in a Place difficultly manag'd with Bandage, would not cicatrize, but thruſt out in the Middle hard Excreſcences of red Fleſh like Pins Heads, which encreaſing grew bigger, firſt one and then another. While I was endeavouring todeterge theſe Excreſcences, they became callous, united with one another, and made an equal Cicatrix notwith-

notwithstanding my Endeavours by the Cauſtick-ſtone to rub down thoſe that roſe higher than their Fellows. At laſt it join'd it ſelf to the Lips round, making a firm and hard Cicatrix, which after ſome Time caſt off a dry Scurf, and became ſoft as the natural Skin.

Obſervation of a Herpes Exedens. *From the ſame Author.*

A Gentleman of about Forty Years of Age, of a Sanguine Complexion, and Plethorick, came to me with a *Herpes Exedens* affecting the Eye-lids. It had been of ſome Years Growth, and began on the Middle of the upper Eye-lid, near the *Cilia*, or Edge, in a ſmall *Puſtule*, and in Continuance ſpread along the Edge to the External *Canthus*, where it eat deeper into the Skin, and by Eroſion caus'd an Ulcer of a round Figure, of the Breadth of a Silver Penny, ſetting into that Corner of the Conjunctive Membrane, and thence the Length of the lower Eye-lid, conſuming it downwards, leaving the neighbouring Parts ſcirrhous. The Eroſion in theſe Parts were encreaſed by the continual Fluxion from the inflamed Eye, for the Upper Lid, where the *Herpes* firſt aroſe, was not ſo much concerned, the Original *Herpes* lying there not unlike a *Hordeolum*. Upon View of this Ulcer, I deſired a Conſultation; and to that Purpoſe, Dr. *Tho. Cox* and Mr. *Hollier* met me. Collories of a cooling and drying Quality were preſcrib'd; Blood-letting in the Arm, Purging, with a Decoction of *Epithymum*, *&c.* and the Second Day after the External Jugular was open'd, and about Ten Ounces of Blood taken: Fontanels were alſo made betwixt the Shoulder, and a Seton adviſ'd. The Patient thus fitted, took a Journey upon extraordinary Occaſions into the Country. About a Month after he return'd, and put himſelf again into my Hands. I treated the *Ulcer* with *Epuloticks*, of various Sorts and Forms, applied Frontals to intercept the Deſcent of Humours, purg'd him with Calomel and Rhubarb, preſcrib'd Vulneraries in a Decoction of Sarſa, *&c.* with Alſamicks to temper the Acrimony of the Humours. This Method not ſucceeding, we conſulted a Phyſician, who preſcribed cooling Juleps of diſtill'd Milks, *&c.* But he growing hereby indiſpoſed in his Stomach, and the Ulcer raging, he return'd to his former Preſcriptions; and by the taking Bezoar Mineral thoſe Days that he intermitted Purging, and by the Application of *Unguent. Calaminar.* he was reſtor'd to better Health, and the *Ulcer* was more ſedate: Upon which he ſupplied himſelf with ſome of the ſame internal and external Remedies, and retired into the neighbouring Country. About Six Weeks after he ſhewed himſelf to me, and the *Ulcer* in and near the external *Canthus* was almoſt healed, and the other Parts well diſpoſed. He then recruited himſelf with more Medicines: Since which I have not ſeen him, but hear it encreas'd in the Country, and that he had almoſt loſt the Sight of that Eye.

Obſervations of Putrid and Sinuous Ulcers. From the ſame Author.

A Woman of about Forty Years of Age, ſcorbutically and hydropically affected, having long laboured under a ſordid Ulcer in the Country, on the Inſide of her Leg, with great Pain, came at laſt to Town, and put her ſelf under my Hands. The Ulcer was large and deep, with great Putrefaction. The Leg was much ſwell'd, inflam'd, and had been excoriated in the Parts about by Acrimony of the Matter, and by the Application of *Nutritum* and the like the Matter was cruſted in, and alſo an *Hyperſarcoſis* was riſen underneath very large. I fomented the Parts affected with Wine, and waſh'd the Ulcer with Spirit of Wine and *Ægyptiacum*, then with a *Spatula* thruſt out the putrid Fleſh, and ſtrew'd the Ulcer with Precipitate, dreſſing it with Pledgets preſs'd out of the ſame Solution, and applying an Empl. of *Diachalcitis* over it, with Compreſs and Bandage. The next Morning I took off the Bandage and Plaiſter, fomented the Ulcer with a *Lixivium*, applied *Mundificativum Paracelſ.* with Oil of Turpentine on the Ulcer, and a Cataplaſm of Bean-Flower, with Oxymel, and roll'd it up as before, cauſing her to keep her Bed. The Day after I purg'd her with an Infuſion of Sena and

Syrup of Buckthorn, with Roſes Solutive; and preſcrib'd her a Decoction of Sarſa and Guajacum, with Antiſcorbuticks. Having by the Dreſſings aforeſaid removed the Putrefaction, I endeavoured to incarn with the Sarcotick Ointment, and applied a Cerate over it, with good Bandage; but it would neither deterge nor incarne, nor yet digeſt, for Two Days, till I put on a lac'd Stocking; by the Uſe whereof the Influx was reſtrained, and the Lips preſs'd down. Having diſpoſed the Ulcer to a healing Condition, I incarn'd it with the aforeſaid Ointment of Honey diſpunated, mix'd with Sarcotick Powders. While I was doing that, I rubb'd Part of the Lips, which were callous, with a Cauſtick-Stone, and alſo rubb'd the *Hyperſarcoſis* off by ſome of the ſame Cauſtick. After Separation of the Eſchars I cicatriz'd the Ulcer and neighbouring Ulcerations with Epuloticks; then made her a Fontanel in the other Leg, and return'd her into the Country cured.

A Maid of a groſs full Body, aged about 23 Years, wanting her natural Evacuations, an Abſceſs thruſt out on the Inſide of the Calf of the Left Leg, and terminated in a callous ſordid Ulcer. After ſome Endeavours ineffectual in the Country, ſhe was ſent up to *London*, and recommended to me by Sir *Fran. Prujean*. The Ulcer was large and deep. I dreſs'd it with Ointment of *Ægyptiacum*, *Baſilicon*, and *Empl. Diacalcitis*, with a Compreſs dipp'd in Claret, rolling it up from the Foot to the Knee. The Phyſician began with the Direction of a purging Draught; and the Second Day after I let her Blood. She was alſo preſcrib'd the *Decoct. Traumatic. Londinenſ.* and once a Week purg'd with *Pulv. Cornachin.* I further'd the Deterſion of the Ulcer by rubbing it with the Vitriol-Stone, and afterwards digeſted, and endeavoured to incarn with Sarcoticks, as in the former Obſervation: But on a ſudden, without any Cauſe, the Matter became ſanious, and flowed in great Quantity. I then dreſs'd the Ulcer with *Pulv. Andronis* mix'd with *Baſilicon*, fomented the Parts with Tops of Wormwood, St. John's Wort, Red-Roſe Flowers, and Myrtle-Berries, boil'd in Wine, and by Intercipients upon the Knee, and good Bandage, endeavoured to reſiſt the Influx. Upon my Complaint to the Patient and her Relations of the Difficulty I met with in the Cure, I perceived by them that the Ulcer had been frequently ſubject to ſuch Diſcharge. The Phyſician was again conſulted, who concluded they were the *Menſtrua* that thus periodically affected the Ulcer. She was again let Blood and purged, and put into a Chalybeat Courſe. A Fontanel was alſo made in her other Leg: During which I proceeded again by Deterſives, to wit, the Vitriol-Stone, Mercury Precipitate, and with *Paracelſus*'s Mundificative, applied Defenſatives, with Compreſs, and a lac'd Stocking, by which Method the Ulcer ſeem'd a while well diſpoſed to incarn; but the *Menſtrua* being ſtill obſtructed, the Ulcer became again diſtemper'd, and rendered all my Endeavours fruitleſs.

I having ſpent ſome Months in this Work to little Purpoſe, they grew weary of me, and were deſirous to make uſe of an Empirick, who had ſeen it in my Abſence, and promis'd a ſpeedier Cure. I gave Way to the entertaining him. He alſo dreſs'd the Ulcer after his Way; but his Endeavours proving alſo unſucceſsful, they came to me again. I finding the Leg much inflamed and ſwell'd, and more ſordid, dreſs'd the Ulcer with Detergents, as aboveſaid, applying *Galen*'s Cerate over the diſeas'd Part with Compreſs and Bandage as heretofore, and, by Sir *Francis Prujean*'s Leave, gave her a few Grains of Turbith Mineral the next Day, and it gave her Four or Five Vomits, and a Stool or Two. The Day following I fomented the Ulcer as at firſt, continued the Uſe of the former Dreſſings, put her on a lac'd Stocking, and repeated the Uſe of the Turbith Three or Four Times, avoiding Salivation. We alſo put her into a Drink of Sarſa, Guajacum, &c. and by this Method incarned the Ulcer, and by a Malagma of Lime, waſh'd and beat up with Fat, cicatriz'd it. By the continuing of the lac'd Stocking ſhe remained well; and after ſome Months thoſe Evacuations came naturally down of themſelves, which by no Art would be perſwaded, and ſhe remained well.

A married Woman aged Thirty Five Years, having lain a great while lame with a Pain in her Right Leg, ſuppos'd a *Rheu-*

ſm. After frequent Bleeding, Purging, *&c.* t ſwell'd on the Outſide from the Garter- ing to the Heel, and diſcharg'd its Matter ear the Heel. Some neighbouring Surgeon nd Apothecary were employed, who dreſs'd t, and preſcrib'd her Phyſick accordingly; nd after ſome Time permitted the Ulcer to loſe, endeavouring to perſwade her ſhe was cured: But it ſwelling ſoon after with Inflamnation, I was ſent for, and ſaw he Ulcer near clos'd; but the Quantity and ll Quality of the Matter ſhew'd it ſinuous, nd upon Search I diſcover'd it ſo to the very Gartering; alſo a *Sinus* running down owards the Heel. I dilated the Orifice with Gentian Roots, applied a Cauſtick about an nch and a half in Length upon the *Sinus* bove, and gave Vent to the Matter, dreſ- ing it up with Lenients, as *Baſilicon*, with Oil of Roſes; and after the fomenting it, pplied *Galen*'s Cerate, with Compreſs and Bandage, ſuppoſing the Matter would be ntercepted, and the *Sinus* beneath thereby iſpoſed to cure. But after Separation of his Eſchar, the Ulcer appear'd hollow under ke Lips; and the Matter flowing from the emaining *Sinus* above, put me upon a Ne- eſſity of laying that open by a Snip with a Pair of Sciſſars; and after all my Endea- ours, I was glad to lay open the lower- moſt *Sinus*, from the Ancle downwards, efore I could diſpoſe it to cure. The ſe- eral Cavities being laid open, I dreſs'd hem with Digeſtives, Deterſives, and Epu- oticks, accordingly as they requir'd; then heriſh'd the native Heat in the Member by ood Fomentations, and by Intercipients nd Bandage reſtrain'd the Influx of Hu- mours.

To add to this poor Woman's Miſery, ſhe ad a Fontanel formerly made upon the endon of the *Biceps*, which had cauſed a ontraction of her Arm, and a hard Tu- our on the Inſide of the *Radius*, with reat Convulſion in her Hand and Fin- ers. This very Pain kept her watching ay and Night, exceedingly exhauſted her pirits, and put ſuch a Ferment in her lood, that it ſeem'd to me difficult to cure r Leg, whilſt this Diſturbance continued on r. Wherefore I began with the Embroca- on of the Arm, and ſo downwards with ls; Take Nerve Ointment, three Ounces; Oil of Earth-worms, two; Fox-greaſe, one Ounce; Oil of Origany and Lavender, of each a few Drops; mix them together. And I applied over the Tumour on her Wriſt, a Mixture of the Plaiſter of *Diacalcitis* with the Gums and Mucilage. I alſo preſcrib'd her an Infuſion of *Sena*, *&c.* with Manna and Syrup of Apples purging, and that Night a Grain of *Laudanum* in Conſerve of Roſemary, and Syrup of Clove-Gilliflowers, and a Cordial Julep of Black-Cherry-Water, Lime-Flowers, Lillies of the Valley, Cinnamon-water, Confection of Alkermes, and Syrup of the Juice of Lemons, of which ſhe drank frequently: She was alſo purg'd once a Week with *Calomel*, and at other times took *Antimony Diaphoretick*. Thus I reſolv'd the Tumour in her Wriſt, and the Contraction of her Arm, and reſtor'd the Uſe of her Hand, during which the Ulcers in her Leg digeſted, incarn'd and cicatriz'd, according to the Method preſcrib'd in the general Chapter of Ulcers. Her Leg being extreamly emaciated and weak, I adviſ'd the Bathing it with Fleſh-Broth, wherein emollient Herbs had been boil'd, by which it afterwards grew ſo full, that I was neceſſitated to put her on a laced Stocking; and thereby the Swelling was reſtrain'd, and ſhe recover'd Strength to walk on it very well.

The ſecond Obſervation of a Sinuous Ulcer was in a Maid-Servant aged Twenty ſix Years, who had a ſmall *Phlegmon* on a Part of her right Breaſt tending to Suppuration. I ſuppoſing it ſimply ſuch, confidently undertook the Cure; and having ſuppurated it by the Application of *Baſilicon*, I open'd it by a Cauſtick, and diſcharg'd a purulent Matter; which increaſing daily with Diminution of the Inflammation and Tumour, I made a ſearch with a Probe, and penetrated into the Cavity of the *Thorax*. I then diſcourſing with her, inform'd my ſelf that ſhe had been long diſeas'd with a Cough and frequent Shortneſs of Breath. I was much aſham'd of my confident undertaking it. The Rarity of the Caſe deceiv'd me, and as many as afterwards ſaw it, every one judging the Ulcer ſimple: But its Penetrating as I ſaid, ſhewed the Cure difficult, and the Work of Time. Therefore I fitted it with a *Cannulæ*, which I retain'd

with a Snip of Plaiſter, and applied a thin Piece of Spunge preſs'd out of Wine upon it, with Compreſs and Bandage over, directing the Dreſſing it twice a Day. After I had thus heal'd up the reſt of the Ulcer, I left out the *Cannula*, put in a Pea, and kept it as an Iſſue, till Nature ſhou'd diſpoſe the *Viſcera* within to a better Condition. But ſhe growing Hectical, remov'd into the Country with internal Preſcriptions and Directions to dreſs herſelf; where I ſuppoſe ſhe is ſince recover'd of her Fever.

Some time ago I was accidentally conſulted in the Country, by a Surgeon there, about an apoſtemated Breaſt, the biggeſt I ever ſaw. The Patient was a Woman of about Forty Years old, ſhe had a Cough, 'twas oppreſs'd with Difficulty of Breathing; the Surgeon open'd her Breaſt in the declining Part, and diſcharg'd a proportionable Quantity of fætid Matter. She was ſomewhat reliev'd by it; but it penetrated into the *Thorax*, and the large Diſcharge of Matter ſoon waſted her.

A Child of about Four Years of Age was brought to *London*, ſuppos'd to have the King's Evil. It had three Ulcers lying near one another on his left Side, between the two lowermoſt of the true Ribs: They were accompany'd with Inflammation and Excoriation. He was much emaciated and afflicted with a Cough and Shortneſs of Breath. Upon Search with a ſmall Wax-Candle into the upper Orifice, I penetrated between the Ribs, and felt the Edge of the uppermoſt Lip foul. The other Ulcers were made by the Inſinuation of the Matter, for want of timely inlarging the firſt Orifice. I dreſs'd the Excoriation with the white Ointment camphorated, and *Galen*'s Cerate, and apply'd ſome of the mild Cauſticks, by which I inlarg'd thoſe Orifices. After the Separation of the Eſchars, I dreſs'd the lowermoſt with Ointment of Tutty, and cur'd them; the Uppermoſt I kept open as an Iſſue with a Pea, for the Diſcharge of the Matter from within, not concerning my ſelf in the Exfoliation of the Bone, but leaving that to Nature, which ſeldom fails where the Ulcer is kept well digeſted. During my proceeding thus with the Ulcers, the Child was preſcrib'd a Decoction of *Sarſa*, with Pectorals, and his Body kept open with Syrup of Rubarb, *&c.* ſome Calomel was alſo order'd with Ceruſe of Antimony and the like, and the Child recover'd. But while the Attendants grew ſecure and careleſs in Dreſſing the Ulcer, the Pea ſlip'd out, and the Orifice cloſing in the Matter, he was ſeiz'd with a Cough, Difficulty of Breath, and Fever: Upon which account I open'd the Ulcer again and relievd him. He went into the Country ſoon after, and by the foreſaid Method recover'd.

A Man of Forty Years of Age labouring under a Fever in the Country, it terminated in an Abſceſs within the Breaſt, and paſs'd its Matter at laſt into the right *Axilla*, raiſing a large Abſceſs there; which being left to Nature, made its Way thro' the Skin, but not having a ſufficient Aperture, or in Time, the Matter invaded the Interſtices of the Muſcles, and ſpread it ſelf over all the Breaſt and Side, and did not diſcharge it ſelf outwardly otherwiſe than as it overflow'd, by which Means the Abſceſs became very large, and the Quantity of Matter had well nigh exhauſted the Patient. It was my Chance to come into that Country, and being deſired to give him a Viſit, and ſeeing the Cauſe of it, I preſently made a long Inciſion in the lower Part of his Breaſt, and gave Vent to the Matter; and afterward made another Opening from the Ulcer in the *Axilla* downwards, where the Matter was ſtreightned by a hard *Callus*. In other Parts, where the Matter was alſo contain'd and cou'd not be diſcharg'd by the former Openings, I applied Cauſticks, and the next Day divided the *Eſchars* thereby, giving Way to the remaining Cavities to empty themſelves. This being done, I left Medicaments and Directions for the Dreſſing them, *viz.* *Baſilicon* for Digeſtion; *Paraceſus's* Mundificative, Red Præcipitate, and vitriol Stone for Deterſion: The Sarcotick Ointment to incarn, and Ointment of Tutty with *Deſiccativum Rubrum* for the cicatrizing the Ulcer: For whatever People pretend of Cure by Injections, the Way is ſlow and hazardous, they often rendring the Ulcers more ſinuous, and being of Uſe only where the Ulcer may not be open'd by reaſon of the Conſiderableneſs of the Place.

H

ere in this Caſe, after the Matter had free ent, the Ulcer cur'd eaſily.

A Daughter of a ſubſtantial Citizen la- our'd under an Abſceſs in the Region of er left Kidney, and was long treated by a old Empirick, who promis'd Cure: But fter all his Endeavours, the Child lan- uiſhing under the Ulcer, ſometimes by aſon of the great Diſcharge of the Matter by Urine, and other Times thro' the Suppreſſion f it, great Humours were ſtirred up within he Body, and outwardly in the Abſceſs. I eing conſulted, obſerv'd that the external bſceſs took its Original from the Ulcer ithin the Kidney, and requir'd other man- er of Dreſſing, its Cure being the Work of ime. I propos'd the laying it open to the ery Part where the Matter paſs'd forth om the Kidney: To which Purpoſe I ap- lied a Cauſtick upon the Sinus below, ivided the Eſchar, and dreſs'd it up with enients. Then after Separation and Di- eſtion of the Ulcer, ſearching the ſame ith my Probe, I found the *Sinus* run up bove the Orifice; which being alſo laid pen, I diſcover'd the Paſſage into the Kid- y, and felt the Side of the laſt Short Rib rr'd by the Matter in its paſſing out. I eſs'd the Ulcer with the Mundificative of allage, and healed up the remaining *nus's* above and below, to the very perture. While I was doing this Work, r. *Barwick* was conſulted to help us in the ure by Internals, who preſcrib'd a trau- atick Decoction of *Sarſa, &c.* with the ore temperate Plants, and balſamick Pills, contemperate the Humours: During my ſpoſing of this Ulcer to retain a *Canula*, e Matter diſcharg'd by Urine in great uantity, and the Patient was as ſore af- ected, and had the ſame Symptom that thers have, who are affected with Ulcers Stones in the Kidney; but after Vent as given, by a ſhort *Canula* of Lead, ſhe cover'd. Having continued the Uſe of e *Canula* ſome Months, I removed it, and pt a Pea juſt in the Opening, and by Red arndrap and Compreſs, retained it on: hen left her to her Mother to dreſs, and ly call'd ſometimes, when they gave me otice of their Wants. After a Year or ereabouts that they had kept this Fontanel en, the internal Pains and Diſcharge of Impunities ceas'd, and ſhe grew more fleſhy and ſtrong; ſhe went alſo daily to a neigh- bouring School, where ſhe was exerciſ'd in Dancing, *&c.* After the Space of two Years or thereabouts, the Ulcer ſeeming not to matter more than might be expected from a ſmall Fontanel, the Mother caſt out the Pea, and permitted it to heal up: But being ſoon alarm'd by the old Accidents, which re- turn'd upon the Child, ſhe ſent for me. I open'd it again, and left them to keep it ſo. Dr. *Barwick* was alſo again conſulted, who repeated the former Method with ſome little Alteration. The Ulcer was afterward kept open near three Years, during which ſhe repeated her Courſe of Phyſick Spring and Fall, and was frequently brought to me. At length I ſeeing her well grown, fleſhy, and of a healthful Complexion, and the Fontanel in a Manner dry'd up, I adviſed them to throw out the Pea, it being of no Uſe: They did ſo, from which Time the Patient conti- nued ſtrong and well, and is ſince married.

A young Gentleman of about ten or eleven Years of Age, was afflicted with a *Sinuous Ulcer* on his right Side of the Spine: It had taken its Original from a Tranſlation of Matter riſing from within his Body, whilſt he lay ſick of a Fever in the Coun- try. It came at length to Maturation, and was let out by a neighbouring Surgeon, but it proving difficult of Cure, he was brought to Town. He was Hectick, and diſeas'd with a Cough and Shortneſs of Breath, the Abſceſs mattering much, but eſpecially when he bow'd his Body down- ward, or lay in his Bed upon the contrary Side; alſo in lying upon his Belly the Mat- ter run forth by Spoonfuls, and upon hold- ing his Breath it blubber'd forth, which ſhowed it came from within. Yet notwith- ſtanding, upon preſſing with our Hands upon the Muſcles of that Side the Spine, there diſcharg'd Matter, we were apt to think it lay originally between the Muſcles of that Place. Dr. *Micklethwait* was conſul- ted, and entertain'd their Phyſician, and was often preſent at the Dreſſing the Pa- tient. The Apertion was ſmall and ob- ſtructed by a callous and luxurious Fleſh within the Ulcer, whereby neither the Probe nor Wax-Candle cou'd make any conſider- able Way. We were ſatisfied that there

were

were more *Sinus's* than that tranſverſe the Back, yet by the Search of a Probe we cou'd make no Diſcovery, but about three Days after, a Redneſs in the Skin ſhew'd us a *Sinus* lying near the *Os Ilion* of about two Inches long, the Skin ſeeming thin. I open'd it with a mild Cauſtick, and having divided the Eſchar, I paſs'd in a Probe from thence towards the Spine; but that not ſatisfying me, I apply'd a Cauſtick upon the old Orifice, and another lower, whence I had preſs'd out Matter. Then dividing them, I fill'd them with Precipitate, and by Rubbing into thoſe Eſchars afterwards with the Cauſtick Stone, I penetrated into the *Sinus's*. One of theſe diſcharg'd the Matter which flow'd that Way, and the other ſerv'd our Purpoſe to diſcover the *Sinus* penetrating under the uppermoſt falſe Rib, towards the Breaſt, which I dilated, and by Deterſion enlarg'd the Paſſage, then fitted the Ulcer with a *Cannula* of Lead, with an Emplaiſter, Compreſs and Bandage over it, by which the Matter diſcharg'd very well, and the Patient was relieved in his Cough, and recover'd his Appetite. The other Apertures having emptied the external *Sinus's* were deterg'd and cured. After the Uſe of the *Cannula* ſome Days, perceiving looſe Fleſh to ariſe in the Ulcer, which hindred the Diſcharge of Matter, and that the Activeneſs of our Patient cauſed the *Cannula* frequently to ſtart out of the *Sinus*, and ſometimes ſit uneaſy, I left it out altogether, and put in a large Pea with a Thread in it, to pull it out at Pleaſure. By this, with Application of the common Sparadrap for Iſſues, this Ulcer was a Fontanel kept open, and the Matter plentifully diſchar'd thereby: His Habit of Body was alſo by the Phyſician's Preſcriptions of vulnerary Decoctions and Balſamicks with lenient Purgatives ſo well reſtored, that he return'd into the Country with his Parents. Some time after coming again to *London* with them, I gave him a Viſit, and found him fat and well recover'd. I did not ſee the Ulcer, but was aſſur'd from himſelf and Servants that it was kept open with much Eaſe, and that it matter'd but little. I adviſ'd then the keeping it ſo, while any Matter flow'd to the Part, which they did, and thereby cured him.

Of Dreſſing Gun-ſhot Wounds af Extraction; of other Accidents falling them, and of Sinuous Ulce From the ſame Author.

AS ſoon as you have made a Separation the extraneous Bodies, as hath be taught before, that there is neither Put faction, nor any Thing tending that W as in recent Wounds there is not; be diſcourag'd at whaſoever ill Aſpect it th hath, but conſider its livid Colour, a have ſaid, to be uſual in theſe Wou where the Contuſion is not only ſimple the Skin, but through Fleſh and all as as the Bullet or Splinter went, extingui ing the natural Heat: So not wonder if hath the Colour of a gangren'd or poiſon Wound. Therefore be not diſturb'd in yo Thoughts, but having taken out the Bul or Pieces of Splinters, dreſs it up as a co tus'd Wound with Oil of *Whelps*, or t like, as hot as the Part will bear, not g ving Credit to any that ſhall perſwade y to the Contrary, no, tho' it be near a Bo for the Gleet will foul it more than yo greaſy Medicaments: Therefore dreſs it wi ſome of theſe; Take Oil of white Lil ſix Pounds, boil in this two Puppies ne whelp'd, till the Fleſh fall from the Bo then add Worms waſh'd in Wine, o Pound; boil theſe ſome time, then ſtra them gently, and add three Drams of Tu pentine, one Ounce of Spirit of Wine; r ſerve this for your Uſe: Or, take Linſe and Hemp Oil, of each four Ounces; M ſtick and Frankincenſe, of each three Dram Myrrh, a Dram; Oil of Earth-worms a Elder, of each three Ounces; mix, or e uſe Spirit of Wine, half a Pint; Turpentin a Pound; Oil of St. *John*'s Wort and Li ſeed, of each half a Pint; Dragons Bloo one Ounce.

With this latter I cured a Servant of *A* ſhot in the Hand. This digeſted t Wound; and after the Slough began to ſ parate, I felt part of a Bone bare, which dreſs'd with Extract of Scordium diſſolv in Honey of Roſes, with which I deterg and feeling the Bone afterward incarned, alſo incarned the Wound, and cicatriz'd wi

ith Ointment of Tutty, *&c.* and in few ays after, cured it without any Difficulty. *reaus's* Liniment with any of the afore- id Oils is very good, adding a few Drops Oil of Turpentine, which by its Subtilty netrates, and by its Warmth rouzeth the tural Heat in thoſe cold Parts, and put- h them upon Digeſtion and Separation. *uercetan* recommends this following; Take w Wax, Roſin and Pitch, of each four unces; Goats Suet, Veal Marrow, of each o Ounces; Oil Olive, a Pint; melt and ain them for Uſe. He adds a Dram of ecipitate to every Ounce of this, but in cent Wounds this will not be neceſſary; you will find by Experience, that theſe ounds will digeſt and ſuppurate without and that frees them from Putrefaction. or will it be always for your Credit if you nſider the Quantity of Balſams we uſe in ch Wounds, and what Prejudice ſome ople may receive, either by its ſalivating em, or otherwiſe affecting their Spirits; t Precipitate and Axungia, with a few rops of Oil of Turpentine, was a com- on Medicine amongſt us: But I refer that you, it being a good Remedy to reſiſt trefaction, and haſten Separation of the chars. You ought to dreſs up theſe ounds lightly, with a proportionable ſoft nt and Pledgets dip'd in ſome of the Di- ſtives very warm, but not to ſcald them. ter that, embrocate the Parts about with l of Earth-worms, Roſes, Myrtles, of ch three Ounces; two Spoonfuls of Vine- r, or the like, and mix them. In the reſſing, your Applications over the Wound d Parts about, ſhould be ſuch as have a rtue to hinder the Flux of Humours, and engthen the Parts. To which Purpoſe, ke Barley and Bean-flower, of each ſix unces; Red Roſes and Myrtle-Berries, of ch one Ounce and half; Quince-ſeed, ſix rams: Boil all theſe to the Conſiſtence of Pultiſe, adding at laſt two new-laid Eggs th two Ounces of Oxymel. If you ap- ehend this too heavy; you may add Oil Roſes and Myrtles, with as much Wax is neceſſary, and make it into the Form a Cerate. Above the Wound lay one of e following Defenſatives, which you may ve always ready by you; Take Bole, four unces; ſeal'd Earth three Ounces; Dragons Blood, one Ounce and half; burnt Harts-horn or common Bones, three Ounces: Or, Take Powder of Red Roſes and Myrtles, one Ounce; Bole and ſeal'd Earth, of each ſix Ounces; Plantane, Nightſhade Juices, of each two Ounces; the beſt Vinegar, four Ounces; Oil of Roſes and Myrtles, of each ſix Ounces; Wax, what ſuffices; mix them, and apply your Compreſs dip'd in Vinegar: Let your Bandage be put on equally and gently, to retain your Dreſſings, and hinder the Influx of Humours.

Having thus dreſs'd the Patient, conſider preſently of letting him Blood; eſpecially if he loſt little or no Blood from the Wound, or if there be a *Plethora* join'd with it. In which Caſe, Revulſion made from the Side is commended by *Galen.* A Clyſter ſhou'd proceed Blood-letting: It may be made of the common Decoctions, or of Mallows, Violets, Beets, Mercury, Bay and Juniper-Berries, with Oil of Linſeed, Honey of Roſes, Hiera Piera, Elect. Lenitive, *&c.* But if you have not theſe in Readineſs, make your Clyſter with Fleſh Broth, Oil of Camomil, Sugar, and the Yolk of an Egg, with a little Salt; or in caſe of Neceſſity, Salt-water with a few Camomil Flowers boil'd in it and ſtrain'd, adding a little Butter or Oil and courſe Sugar. Any ſuch like may ſerve for a good Clyſter.

It will alſo be requiſite you be furniſh'd with ſome Cordials, to reſiſt the putrid Vapours, and refreſh the Spirits; which you may do externally by ſome *Epithemata* of diſtill'd Waters, as of Balm, Bugloſs, Roſes, and Vinegar, with the Powder of the Roots of Tormentil, Scordium, Scorzomera, Contrayerva, or other Cordial Species, of which you have Variety in every Diſpenſatory. And with ſome of the aforeſaid Waters you may make Cordials alſo, by adding Syrup of Citrons, Gilliflowers and Alkermes: For inſtance; Take Bugloſs and Cinnamon-water, of each two Ounces; Confection of Alkermes, one Scruple; Bezoar, twelve Grains; Syrup of Lemons, two Spoonfuls; mix. For the common Soldier, a Dram of *London* Treacle or Mithridate diſſolv'd in Wine, may ſerve. As to their Manner of Diet in great Wounds, it is neceſſary to obſerve a ſpare One, as Barley Gruels, Panadoes,

nadoes, thin Broth, or a potch'd Egg: But in this the Patient's Manner of Living ought to be conſidered; alſo the Air, for Cold is an Enemy to Wounds: Reſt is likewiſe required, as well to the Mind as Body. Therefore having dreſs'd him, lay him to Reſt with ſix Drams of Syrup of Diacodium, two Spoonfuls of Plague-water, in about two Ounces of Poppy-water.

We ſhall now proceed to the ſecond Day's Work, and therein conſider the Habit of the Body, and more particularly what concerns the Wound. In theſe Gun-ſhot Wounds it may be convenient the Body be gently purg'd by Lenients, as formerly mention'd; in which Caſes, Caſſia, Manna, Tamarinds, Syrup of Succory with Rubarb, taken in Broth, Whey or Piſans are proper.

Having thus propos'd a general Way of Purging, we ſhall again conſider what is requiſite for Dreſſing the Wound, and prepare our Dreſſings, and apply ſuch Medicaments as may be neceſſary. In order to which, you ought to have a Fomentation ready, whereout may be wrung a hot Stupe; to which End, Take Tops of St. *John*'s Wort, Centaury, Scordium, Wormwood, of each one Handful; Red Roſe Leaves, Camomil, Melilot, Elder, of each a Handful and half; boil in Spring-water two Pints and half: To the ſtrain'd Liquor add a Pint of ſower Wine; Spirit of Wine, ſix Ounces: Make a Fomentation. Theſe will give a Breathing to the Parts, and defend the Wound from the Air, while you conſider it. If all be well, continue the Uſe of Digeſtives: But if it be accompany'd with very great Pain, you may Foment with this: Take Marſh-Mallow Roots, Mallows, Vervain, Camomil, Melilot, Linſeed, Fenugreek; boil them in Sheeps-head Broth, and of the Fæces make a Cataplaſm, adding Barley-flower, half a Pound; Linſeed and Quinceſeed in Powder, of each one Ounce; *Baſilicon*, Ointment of Marſh-Mallows, of each one Ounce and half; Hog-Suet, as much as is ſufficient; Saffron, a Dram; at laſt add four new-laid Eggs. Apply it over all, it cheriſhes the Part, furthers Suppuration, and is Anodine.

You are to make the Bandage as before, and continue this Way of Dreſſing to the ſeventh or ninth Day, until you have ſep rated the Sloughs, digeſted the Wound, a have a laudable *Pus*, which is a perfe white Matter, of good Conſiſtence, and n fætid or ill ſcented. If the Matter be D fective of any of the ſaid Qualities, Pre pitate will be of good Uſe mix'd with U *guentum Apoſtolorum*; or make a Mundifi tive with Honey and Turpentine, added the Juices of Agrimony, Centaury, Pla tane and Smallage, to which put a lit Aloes, Myrrh, *&c.* to incarn. If you ha occaſion for Injections, the ſame Ingredie may ſerve.

Of Accidents befalling Gun-ſh Wounds and Sinuous Ulcers. Fro the ſame Author.

FRom the firſt to the eleventh Day, ma Accidents are wont to happen to th Wounds, which not only impede the Cu but often, without timely Help, deſtroy t Patient: And theſe are vehement Pain, *flammation*, *Eriſipelas*, from whence G *grenes* and *Spaceli* do frequently happen. T Remedy is timely, to prevent the Influx Humours, and evacuate that which alre affecteth the Wound; the firſt Way is Bleeding and Purging; the Second by ext nal Application. If Pain be the Cauſe, y muſt ſuccour it by Anodines, which m mitigate and repreſs the Heat of the Pa The next and moſt cruel Symptom, is M tification of the Part, which very often tends great Inflammations, and is ſhrew to be ſuſpected, when they yield not rea ly to Diſcutients or Suppuratives. In th Wounds it happens moſt commonly thro Suffocation of the natural Heat of the Pa by reaſon of the great Concourſe of H mours, or too refrigerating and repell Applications, in the Time of great Infla mations, which have infeebled the Paſſ of the Spirits into the Part. It may be p ceiv'd by the Gleet and Change of Colo it beginning to look livid; alſo by a Di nution of the Tumour, *&c.*

When you ſee ſuch a Change begin, y muſt preſently prepare to withſtand a M tification, by Scarification, not only u the Blood come about the Lips of Wou

Wound, but deep into it through the Eſchar to the Quick, and ſuffer it to bleed freely, and make the Part ſenſibly feel, that by which Means you may disburthen it of part of what would have choak'd it, and make Way for the Entrance of the Operation of the Medicine. Then foment the Part with a good *Lixivium* made of Aſhes, to which may be added Salt and Vinegar: Or you may boil Scordium, Wormwood, Centaury, and the like, in the aforeſaid Lye. After you have well fomented the Place, waſh the Scarifications, and dreſs the Wound with *Ægyptiacum* and *Venice*-Treacle, diſſolv'd in Wine-Vinegar, adding calcin'd Vitriol, *&c.* Then apply a Cataplaſm of Barley, Bean, Vetch and Lupin Flowers, boiled in ſome of the ſame Lye, with an Addition of Oxymel to it.

But in the ſeparating of contus'd Parts, great Fluxes of Blood break out upon us: Thus in a Patient of mine wounded by a ſhot thro' the Inſide of the *Radius*, upon ſeparation of the Eſchar, a great Flux of Blood happen'd. While I was ſtopping the firſt Orifice which was neareſt the Artery, the Blood burſt forth of the other: Hereupon I ſtop'd both the Orifices with ſome ſtringent Powders, rolling up the Wound with a good Compreſs dip'd in a ſtiptick Decoction, laying my common Defenſative over all, and did not open it till three or four Days after. How ſuch Fluxes of Blood are further to be treated, you will find when we come to the *Aneuriſm* under the Diſeaſes of the Arteries.

Gun-ſhot Wounds after Separation of the Eſchar, are apt to become *Sinuous Ulcers*; eſpecially after great Fluxion, and where Bandage cannot be uſed to preſerve the Tone of the Parts, as in the upper Part of the Thigh and Hip, *&c.* Theſe Cavities cauſing much Pain to the Patient, and Difficulty and Trouble to the Surgeon, we ſhall conſider their Cure, taking our Indication from the Parts affected, with the Largeneſs of the Wound, Contuſion and Laceration of Parts: For from ſuch Wounds there muſt neceſſary Loſs of Subſtance, and the Quantity or Quality of the Matter muſt needs render *Sinuous*, eſpecially where the Bandage cannot be conveniently made to thruſt out the Matter.

Therefore to prevent Sinuoſities, you are to enlarge the Orifice at firſt, and keep it ſo wide open, that the Matter which is daily there engender'd may have free Paſſage out: Which if it may not by the Way the Shot went in, then you muſt conſider how in another Place the *Sinus* may diſcharge it ſelf; this being prudently affected, and the Matter thereby diſcharg'd, you ſhall then more eaſily perfect your Cure.

But before you make this Apertion, you muſt conſider whether by altering the Poſition of the Part, or by Compreſſion with Bandage, or by hollow Tents, the Matter may not be brought out. And to make the Cure of theſe Cavities the more eaſy, you muſt endeavour to place the Member in ſuch a Figure that the Orifice may be depending. Alſo you muſt endeavour by Stupes, Spunges, Compreſſes, and good Bandage to preſs out the Matter, that the Cavities may unite. They ſhou'd be wrung out of Red Wine, wherein have been infus'd, Red Roſe Flowers, Myrtles, Pomegranate-Peel, Balauſtians, Cypreſs-Nuts, Sumach and Acacia, and if the Matter do not diſcharge well between the Dreſſings, you muſt dreſs it the oftener. Alſo Injections may be made with a Decoction of Myrrh, Aloes, Orrice-Root, Spirit of Wine, Honey of Roſes, Lime-water, or the like, to diſpoſe the Sinuoſities to heal.

Sometimes in a Wound inflicted on the upper Part of a Member, the Matter not being likely to diſcharge it ſelf thereout, I have by a Seton-Needle perforated it through; and retaining the twiſted Silk in the Ulcer till the lower Orifice was digeſted, then drawing out the Silk, I kept it open by a Tent a few Days, till the upper Part agglutinated; and afterward as the Matter leſſen'd in the depending Orifice, I left off the Uſe of the Tent, and healed it up: So in a Gun-ſhot Wound on the Inſide of the Thigh, paſſing under the Groin ſlanting up to the *Os Ileon*, and apoſtemating in the upper Parts, it not yielding to Cure, by Injections, Bandage, *&c.* I made a *Cannula*, through which I paſs'd a Needle with a twiſted Silk, and kept in the Silk as a Seton, till I had by Gentian-Roots dilated the Orifice ſufficiently for the Diſcharge of Matter: To make the Perforation of the

Needle more certain and eaſy, I applied a Cauſtick firſt upon the Place, the better to feel the End of the *Cannula*. By this Apertion the Matter diſcharg'd it ſelf in what Poſition ſoever he lay, and he was thereby happily cured.

One was ſhot in the Face betwixt the Noſe and Eye, on the right Side, into the *Ethmoides* by a Piſtol-Bullet: After he had been cur'd ſome Years of the external Wound in his Face, he became troubled with a fretting *Ichor*, which diſcharg'd by that Noſtril, and eſpecially at his firſt riſing in the Morning out of Bed, it wou'd run half a Spoonful of a yellow Colour, which had made a Chop or Gutter at the lower End of that Noſtril by its Acrimony. After ſome Years he felt, upon bending his Head backward or forward, the Bullet to roll to and fro over the Roof of his Mouth. He complain'd to me of his Grievance at the *Hague* in *Holland*, a little before his Majeſty's going to *Scotland*. I offer'd to his Conſideration the caſting in Injections, or paſſing a Probe downwards in the Gullet, or be excreted in his Mouth. But theſe Ways had heretofore prov'd ineffectual: We therefore reſolv'd upon cutting thro' the Palate Bone: To which Purpoſe I plac'd him in a clear Light, one holding his Head ſteady, while I cut into the Roof. But the Fleſh was ſo cloſe ty'd to the Bone, that it would not yield to my Spatula as I expected: Wherefore I applied a Bit of cauſtick Stone, and held it to the Place with a Pledget of Lint a few Minutes; by which I conſum'd the ſoft fleſhy Part over the Bone, and afterwards cut into the Bone ſuch a Hole, that in the moving of his Head I could ſee the Bullet lodg'd in the Hole; which encouraging us to proceed in our Work, the Bullet was afterwards taken out, and he eas'd of that Diſcharge of Matter which threatned a filthy carious Ulcer. My Attendance upon His Majeſty into *Scotland* hindring my Proſecution of that Cure, I left him in the Hands of a Surgeon there, and ſince have often ſeen him at Court. But the Ulcer did not cloſe up with a *Callous*, however the Place is ſupplied by a ſmall Plate without Offence.

If the *Sinus* run tranſverſe the Veins, Arteries, Nerves, Tendons, *&c.* you may then, if you think it not ſafe to paſs a Needle in a *Cannula* through it, or if you cannot do it by reaſon of the make of the Part, you may then, I ſay, make Uſe of the Inſtrument us'd in *Fiſtula's* and *Sinuous Ulcers* in *Ano*, by which you may cut aſſuredly upon the End of the Director which paſſeth within the *Sinus*, as if you ſaw it before you. It is commonly us'd where the End of the *Sinus* lies moſt diſtant from the Skin. After which Apertion it muſt be kept open by a Tent, for the Diſcharge of Matter, till it be well digeſted and fit to cure. If the Orifice be ſmall and the *Sinus* lie but under the Skin, and in ſuch a Place as may be ſafely open'd, it may be dilated with prepar'd Spunge or Gentian Roots, and afterwards ſnip'd open by a Pair of probe Sciſſars, or cut by a Knife upon the Director within, or laid open by a Cauſtick. And after you have divided the *Sinus*, you may digeſt it with Turpentine, with the Yolk of an Egg, or deterge by ſome of the Mundificatives ſet down in the Cure of Ulcers in General. And if there be occaſion of more Sarcoticks you may add Honey, with Powder of Myrrh, Frankincenſe, and Orrice Root, to make it more drying. But commonly, the depending Part being once open'd, the Wound cures in few Days by Bandage, *&c.* as aforeſaid.

Gun-ſhot Wounds: From John Moyle *Senior; one of* Her Majeſty's *ancient Sea Surgeons. And firſt of a Wound in the* Gula *by a Piſtol-ſhot.*

ALL Wounds either in the *Aſpera Arteria* or *Oeſophagus*, if long and tranſverſe, are dangerous, whether by Bullet or other Weapon; and if with Loſs of Subſtance, then they are mortal. But if the Wound be oblique in that Part, and ſuperficial and ſmall, it may with Care be cur'd, tho' the Wind may come forth at the Wound. As to Cure, if deep and wide, it muſt be ſtitch'd; but if ſmall and ſlight, it may be cloſ'd with Compreſſes and a Bandage: But which ſoever you uſe, the

theſe, the Application of the following Balſam muſt be applied. Take Dragons Blood, Maſtick, of each one Scruple; Bole, a Dram; Syrup of dry'd Roſes, half an Ounce; the Yolk of an Egg and Turpentine, what is ſufficient; and make them up into a Balſam: Spread this and apply it, and make fit Compreſs and Bandage: Let this lie on three or four Days; the next Dreſſing when you have firſt ſteep'd it well with Spirit of Wine warm, you may apply Balſam of *Chili* with Lint, and a Diapalma Plaiſter over it, or for want of the Balſam or Plaiſter *Arcæus*'s Liniment on Pledgets, and *Paracelſus*'s Emplaſter over it, which will do as well.

Now albeit a nervous Part, as this *Gula* or *Oeſophagus* are, doth not really unite, yet there will a carnous Subſtance intervene and ſpread over the Wound, that will ſufficiently ſupply this Office. But a Gargariſm is neceſſary to gargle the Mouth and Throat withal, during the Cure, as thus; Take Barley pick'd, an Ounce; Flowers of Red Roſes, a Pugil; Balauſtians and Sumach, of each two Drams; Raiſins ſton'd, Jujubes, of each half an Ounce; Liquorice, one Ounce; boil'd in Spring-water, from three Points to a Quart; to the ſtrain'd Liquor add Honey of Roſes and Syrup of Myrtles, of each an Ounce for a Gargariſm. This both moiſtens, is Anodine, and conduceth powerfully to conglutinate the Wound. Beware you keep not the Wound open with Tents in this Part; your Buſineſs is to cloſe and heal it as faſt as you can poſſibly.

Of a Wound in the Muſculus Biceps *of the Arm by a Piſtol-ſhot. From the ſame Author.*

ADmit there happens a Piſtol-Bullet to paſs thro' the *Muſculus Biceps*, entring in at one Part and out at the other, in the large Body of the Muſcle which is the fleſhy Part of the Arm above the Bow thereof; but neither of the two Heads of the Muſcle are touch'd, nor yet the neather Tendon. Now altho' this Wound muſt, till cur'd, be ſomething of an Impediment to the flexor Motion of the *Cubitus*, yet it is not ſo ill, as if the Tail or Tendon of that Muſcle were wounded: And where it is, 'tis not ſo bad as if the *Muſculus Brachiæus* were wounded with it, that lying near it, and both of them Benders of the *Cubitus*.

Now the Bullet paſſing thro' and leaving no extraneous Body in the Wound, ſaves you the Trouble of an Extraction, and leaves you only the Blood to Stop, which may be done with *Galen*'s Powder, and the White of an Egg mix'd, then waſh the Wound with *White-wine* or Spirit of Wine warm, and apply only ſhort Doſſils dip'd in your aforenam'd Reſtringent into each Orifice: But thruſt not long and thick Tents therein, for that wou'd incommode your Cure. But here will be a Retrocedence and Diſſipation of the Spirits, from the Margin or Lips of this Wound, which cauſeth ſome Diſcolouring that is not found in a punctur'd Wound: But the Spirits will by a comfortable Stupe out of warm Spirit of Wine ſoon return to the Outſide of the Wound again, and the Cure will not much differ from that of a punctur'd Wound in the ſame Place.

After this you may dreſs the lower Orifice with Balſam of *Chili* warm on a ſhort Doſſil, to digeſt and keep a Paſſage open for the digeſted *Pus* to vent; but heal the upper Orifice as ſoon as poſſible with *Arcæus*'s Liniment, or ſome other Balſam on a Pledget or ſoft Doſſil, and let *Diapalma* or *Paracelſus*'s Plaiſter be apply'd over all, and your lower Orifice be likewiſe heal'd as ſoon as the Wound is well digeſted, for then you may apply only a ſoft Pledget there likewiſe. This is the beſt Way to treat this ſort of Wounds, and long Tents ſhou'd not be cram'd in them; for the divided Fibres will cloſe themſelves and touch each other if not hindred by Tents, and the fibrous Part of the Blood that gleets from them will be their own Balſam; and Nature, by the Help of any kindly Aſſiſtant, will digeſt and heal the Wound inwardly, and expel any ſuperfluous Matter whilſt this is a doing: For I muſt tell you, what Balſam you lay on Pledgets to the Orifice of the Wound, is by Nature imbib'd into every Part of the Wound that hath need of it; ſo that here will be a kindly Healing, as it were by the firſt Intention. And this

very Method may fitly ſerve for Stabs or Punctures in any remote Part of the Limbs: Only remembring to anoint well with Oil of Whelps or St. *John*'s Wort warm, after you have ſtup'd with Spirit of Wine, and before you apply the Balſam and Plaiſter: This with Compreſs and Bandage is ſufficient to perform the Cure of this or any ſuch like Wounds. Thus Fomentation, Embrocation, and the Plaiſter powerfully aſſiſt Nature to prevent Accidents, and digeſt the Wound; and Nature by this takes Advantage of agglutinating and expelling any ſuperfluous Matter that wou'd hinder. Hence it is, that in the Healing of all ſimple Wounds, we conſtantly ſee Moiſture on the Plaiſter that we take off.

Of a Wound by a Musket-Bullet in the Thigh.

SUppoſe this Bullet hath paſs'd thro' the *Muſculus Rectus*, and having touch'd the *Os Femoris*, is lodg'd in the *Muſculus Triceps*, the Wounding of theſe two Muſcles cauſes that the Patient cannot draw the Leg inward, becauſe the *Triceps* is hurt: Neither can the Leg be extended, becauſe the *Rectus* that is an *Extenſor* is wounded. Now tho' there is no Loſs of Subſtance in this deep Wound, yet the Bone is graz'd upon, and the Shot remains in; and there is neceſſarily a large Contuſion and Solution of Continuity, and ſuch a Receſs of the Spirits, that it cannot be cur'd; but by the ſecond general Intention for the fleſhy Part being ſo far dilated by the Shot, is ſo contus'd, that a great Share thereof muſt come forth in Matter, and ſound Fleſh be generated in the Room of it.

But firſt the Bullet muſt be extracted, as alſo any other foreign Body that it may have carry'd with it, and then the Bleeding muſt be ſtop'd, and the Part defended from farther Accidents. As to extract the Shot, or any other foreign Body, you muſt ſearch with your Probe where it lieth, and then with your *Forceps* or *Terebellum* you muſt extract it; but if you find it is almoſt gone thro', and yet not quite, you muſt make Inciſion in the Place where you feel it, and with your Inſtrument puſh it thro'. Then ſtop the Bleeding with *Galen*'s Powder, or Stiptick-water, dipping a ſlender Tent therein, and on the ſame a Pledget bound over. Then anoint the Limb all about with Oil of Roſes, and if you are apprehenſive of a Flux of Humours, apply over it this defenſative; Bole, Dragons Blood, Maſtich, Frankincenſe, of each three Drams; the White of an Egg and Vinegar, mix all together, ſpread and apply to the Part; or elſe, Take Plaiſter of Minium and Diapalma, of each half an Ounce; Oil of Myrtles and White-wine Vinegar, as much as is neceſſary, mix'd and ſpread upon Leather, let this be apply'd, and make good Compreſs and Bandage.

The next Day, or when you open it, the ſooner the better, provided the Bleeding be ſtop'd, you muſt begin with your ſecond *Propoſitum*, or endeavour Digeſtion; for without this, the Wound can never be cured, but will firſt tumify and then inflame, and at laſt gangrene, eſpecially in an ill habit of Body: To effect this, have ready your Sanative *Fotus*; Take Tops of St. *John*'s Wort, Centaury, Betony, Bugle, All-heal, Roſemary and Bay-leaves, of each a Handful; boil them in a Gallon of Spring-water, and add to them a good Quantity of Spirit of Wine: With this ſtupe the Part warm with flannel Stupes, one after another for ſome Time together; then anoint with Oil of Roſes, this gives Life to the Spirits, and recollects them to the Part again. You may ſyringe the Wound alſo with Spirit of Wine, or rather Tincture of Myrrh, becauſe the Bone was graz'd upon with the Shot, and this preſerves from Putrefaction: Then have ready your Digeſtive, made of Turpentine, Oil of Whelps, Yolks of Eggs, of each what is ſufficient, to which add Saffron in Powder, and mix again; or you may uſe *Baſilicon*, two Ounces; Oil of St. *John*'s Wort, one Ounce; Saffron Powder, half a Dram, mix'd together; either of theſe apply'd warm on your Tents or Pledgets are very effectual to the Purpoſe: Over theſe let a Plaiſter of *Paracelſus*, mollax'd with a little Oil of St. *John*'s Wort, be warmly apply'd, and ſo make fit Compreſs and Bandage; and continue this Method each Dreſſing, till you have good and laudable Digeſtion. If the Wound does not digeſt

geſt as you wou'd have it, mix but a lit-
e Precipitate with your *Baſilicon* and apply
, and this together with waſhing it with
incture of Myrrh warm, will anſwer your
nd: For theſe not only heal ſound, but
orrect and mundify to Satisfaction. But
ways mind this, when you correct with
e Precipitate to leave the Point without
the which you muſt dip in the warm
incture to apply next the Bone: And now
the Bone is clear and not carious, which
ou may know by the Smell, then you may
ſier at incarning or filling the Wound
ith Fleſh. The beſt Balſam to effect this
eſign is that of *Baſilicon* and *Arcæus*'s Lini-
ent mix'd; this you may uſe for two or
ree Dreſſings, but if it do not heal faſt
ough, you may mix therewith *Unguent.*
apompholigos, and this will effect it. But
in the incarning the Fleſh ſhou'd grow
roud and Luxuriant, then uſe your Ca-
areticks to eat it away, and mind as it
als to make your Tent ſhorter and ſhorter;
en for Cicatrizing or Skinning, you may
duce it with Ointment of Tutty or *Deſic-*
ivum Rubrum. During the Courſe of the
ure, you ought to order a freſh and
holeſome Diet, and let the Drink be Bar-
y-water, Ptiſan, or Wine and Water, to
drank moderately, and keep the Body
en and temperate by Lenients or Clyſters,
d Bleeding now and then, eſpecially if
e Patient be Plethorick. Thus you ſee it
nſiſts of Internals as well as Externals to
nſummate the Cure as it ought to be.

Obſervations of Gun-ſhot Wounds, &c. *From Mr.* Belloſte, *the Hoſpital Surgeon.*

N the Year 1692, there was brought to
the Hoſpital of *Brianſon* a Priſoner of the
rmy of *Savoy*, who was wounded with a
llet that enter'd near the right Breaſt to-
ards the Arm-pit, and paſs'd out of the
dy four Fingers breadth from the ſixth
rtebræ of the Back, having in its Way
oken aſunder the fourth Rib. I enlarg'd
th the Orifices, but a little more that of
e Back, which was ſomewhat lower than
e other. We dreſs'd him only once a
y at firſt, without either Tents or Dila-
ters, and from the hinder Orifice came forth a certain thin watry Humour, which Evacuation continued till the falling of the Eſchar, after which time he was dreſs'd only once in two Days. I kept the laſt mention'd Orifice open from time to time by Means of a Piece of prepared Spunge, conjecturing there were ſome Splinters of Bone to be diſcharg'd; which accordingly came to paſs without any Pain, about the eighteenth Day of the Wound; from that Time forth I endeavour'd to heal it up, applying between the Orifices, Compreſſes dip'd in warm Wine. During this Cure, I cou'd obſerve no ſenſible *Criſis*, nor did any Accident happen: It was finiſh'd in thirty Days.

In this Wound the Lungs were untouch'd, for any Thing that appear'd; a Rib only being broken, and the *Pleura* hurt: Which indeed had been ſufficient to produce fatal Accidents, had any other Method been follow'd; for if in this Caſe, Tents had been us'd, or had the Wound been cram'd full of Doſſils, as has been done on ſuch Occaſions, the Matter proceeding from the Diſſolution of the Eſchar and the Contuſion being put up between the two Orifices, and ſtill encreaſing and finding no Vent, wou'd infallibly have broken into the Cavity of the Breaſt, from whence it cou'd not have been drawn forth, but by the Operation of the *Empyema*.

An Accident like this happen'd this Year to a famous Officer of our Army in *Savoy*; who having received a Wound that was thought to penetrate, and really did ſo, was dreſs'd with Tents, but the Matter finding the Way by which it ſhou'd have been diſcharg'd from the Body, altogether intercepted, and paſſing among the broken Pieces of a fractur'd Rib, diffus'd it ſelf into the Capacity of the *Thorax*: And in this Condition he died, having his Breaſt full of Matter.

Upon the 22d of *June* 1693, the Marqueſs *de Larray*, Lieutenant General, took by Storm a Poſt in the Valley of *Barcelonetta*, and on this occaſion had Five and twenty or Thirty Men wounded, who were brought to our Hoſpital, and among others, there was one *Simon Cotant*, of the Regiment of *Vendoſme*. This Man had received a Bullet,

Bullet, which went in hard by the Sixth *Vertebræ* of the Back, breaking in its Paſſage the tranſverſe Proceſs on the right Side, and came out on the fore Part of the *Thorax*, between the Second and Third upper Rib towards the left Side.

This Wound was attended with all the moſt dangerous Symptoms that uſe to appear when the Lungs are wounded, and was indeed one of the moſt conſiderable that had been under Cure in the Hoſpital. There was not here any need of Dilating of the Orifices, the Largeneſs of the Size of the Bullet having done it to ſome Purpoſe: The Wounds were dreſs'd without any Tent, but only with large Pledgets, and a good agglutinative Plaiſter; the Compreſſes and Bandage being ſuch as is uſual. Diverſions were made without Delay, and a Courſe of Diet appointed: He was dreſs'd but once a Day, and that with all poſſible Speed. The hinder Orifice of the Wound did blow with ſuch Force, that all the By-ſtanders were ſurpriz'd thereat, and ſuch a prodigious Quantity of *Lympha* did iſſue from it, that oftentimes it was neceſſary to change the Linnen twice a Day: Diuretick and vulnerary Potions were given. This large Evacuation continued for about Twelve or Fourteen Days; after which the wounded Perſon was dreſs'd but once in Two Days. The One or Two and twentieth Day the Aperture of the *Pleura* on the Back was perfectly clos'd up; but in 35 Days or thereabouts, both Orifices were entirely fill'd up.

This wounded Man was ſent to the Hoſpitals, as one of whom all Hopes had been laid aſide; for the Surgeon Major of the Regiment, who had firſt dreſs'd him with great Care, told his Captain that his Death was unavoidable. This ſame Captain about a Month after coming to *Brianſon*, with the Lieutenant-Colonel of his Regiment, who had been wounded with a Sword, was much ſurpriz'd when he was viſited at his Lodgings by this Soldier, who was at that Time as vigorous as before he had receiv'd his Wounds, upon which he had then only a Plaiſter.

If the Gun-ſhot Wounds of this Nature, notwithſtanding the Havock that the Bullet makes in the Places through which it paſſes, are ſo eaſily and ſpeedily cured by this M thod; we have all the Reaſon in the Wo to believe, that the Wounds made by ſha Inſtruments, where there is ordinarily on a ſimple Solution of Continuity, may be c red with much greater Eaſe. But we mu obſerve, that in the Way of Dreſſing, gre Care is to be had of covering ſuch Woun with good ſubſtantial Pledgets, of ſuch Bi neſs, that there may be no Danger of the being puſh'd into the Cavity of the Bre by the Weight of the incumbent Air: A upon the Pledgets we muſt apply a ſtrong a agglutinative Plaiſter, ſuch as that of *Andre a Cruce*, which muſt likewiſe be ſuſtain with a Compreſs of Four Doubles, and kept on with the Napkin and Scapular all which Precaution is neceſſary to wit ſtand the Entry of the Air, which othe wiſe, the Uſe of Tents being laid aſi might paſs into the *Thorax*, and there pr duce fatal Accidents.

In the Year 1692, a Soldier of the Re ment of *Sourche*, whoſe Name I have fo gotten, was brought to the Hoſpit wounded with a Bullet, which enter'd the foremoſt and middle Part of the *Acr mion*, and came out on the upper Part of t Shoulder Blade, breaking the *Acromion* wi a Part of the *Scapula*, as it went along. T Orifices were ſtraitway dilated and dreſ only with Pledgets and the Digeſtive: D verſions were ſpeedily made, and his Di ordered. In the firſt Dreſſings, ſeveral Piec of Bone that could not be re-united, havi been almoſt wholly ſeparated, came awa ſeveral others that were yet tied by a ſma Piece of the *Perioſteum*, tho' in appearan ſhaking and ready to fall off, were yet joi ed again. Finally, all the adhering Splint being again united, the Wound began fill up, and in two Months Time or the about, was brought to a firm and lauda Cicatrix; to the great Surpriſe of all w had been preſent at the Dreſſings, no Acc dent having happen'd all the Time of t Cure.

It will certainly be thought ſtrange t I permitted the Orifices to be clos'd u without expecting the Diſcharge of Bones; and it will poſſibly be ſaid th dreſs'd not according to Art. But to m appears much more reaſonable and advan gre

ous to have preſerv'd them than occaſion'd their Loſs, ſeeing a *Callus* has never the becoming Convenience of a natural Part: And the Excellency of Art conſiſts, in curing ſpeedily, if poſſible, and without Pain; and in preſerving the Figure, Subſtance and Diſpoſition of the wounded Parts. 'Tis certain, that Health being the End of the Surgeon's Art, the principal Deſign is attain'd when the Cure is perform'd.

The following Year, a Granadier of the Regiment of *Navarre*, was brought to the ſame Hoſpital, wounded with a Shot on the upper Part of the left Shoulder Bone, about an Inch or two Fingers breadth below the Joint: The Bullet enter'd on the fore Part, and went out behind, making a terrible Havock. Three or four Days paſs'd wherein he was not dreſs'd, but only ſlightly at firſt, and without making any Diverſion. The whole Arm was diſtended like a Foot-ball, the Orifices were choak'd up, inflam'd and diſpos'd to gangrene.

I made Inciſions in the Orifices, to give Breath unto the Wound, and Scarifications over all the Arm; and having dreſs'd with Digeſtive only, without Tents or Dilaters, I let a good Quantity of Blood run from the Part by the Inciſions to empty it in ſome Meaſure, and afterwards fomented it with Spirit of Wine, and a little Sal Armoniack: I apply'd over all the Arm, *Diapalma* diſſolv'd in Oil of Roſes and Vinegar, which in a little Time abated the Inflammation of the Part, and leſſen'd the Swelling.

Diverſions were not omitted, but in ſpite of all that could be done, three Abſceſſes were form'd; one at the Bending of the Elbow inwardly, another on the outward and middle Part of the Arm, and the Third on the hinder and almoſt lowermoſt Part of the Humerus: They were all three open'd, and by their plentiful Suppuration, the whole afflicted Member was eaſed. After three or four Splinters of the Bone that ſtuck by their upper Part, only to the *Perioſteum* were again join'd, I bent all my Endeavours to bring together and unite the Lips of the Wound: And when the Eſchar was entirely fallen, I uſed only a ſimple Incarnative, dreſſing but once in two Days: The Suppuration was but ſmall, and the Orifices began apparently to fill up, and in Thirty Days were quite Skin'd over: So that from thenceforth I us'd the following Bandage and Plaiſters in order to fortify the *Callus*; and now his Diet is encreas'd, and he is able to riſe from his Bed: At laſt he left the Hoſpital to return to his Regiment 44 Days after he had received the Wound.

The Delaying of the Diverſions, as it evidently appears, was one of the chief Cauſes of the Accidents that followed upon this Wound; and it is plain, that if Tents, Dilaters, or other exaſperating Things had been us'd in Dreſſing, they had infallibly prov'd an Impediment to the Diſcharging of the Part, and ripening of the Abſceſſes. Nature is in ſuch Caſes ſufficiently perplex'd, without the additional Oppreſſion of the moſt grievous of all her Enemies: She is as it were fetter'd and can't act, and when by a healthful and critical Motion ſhe endeavours to deliver her ſelf, as in the Abſceſſes of the former Cure, ſhe is unable to produce any deſireable Effect, ſo long as the Wound is cram'd full of Lint; and the moſt frequent Conſequence of this is a Stifling of the natural Heat, after which follows a Gangrene. There have but few bad Accidents follow'd upon Wounds treated after our Method; and I am bold to affirm, that ſcarce any have miſcarried under our Care, tho' more dangerouſly wounded than this Soldier of whom we have been ſpeaking; all which is owing to the Gentleneſs of this Way, and the Uſe of *Diverſions*.

In the Year 1690, ſoon after the War was declar'd in *Savoy*, a Soldier of the Regiment of *Pondeux*, received a Shot in the fore Arm, on the middle and hinder Part, which broke the *Radius*, and carried away a Part of the *Cubitus*. He was dreſs'd after our Method, but the Cavity of the Wound was fill'd with a Pledget of very fine Lint dip'd in a Mixture of our Balſam and a little Liniment *Arcei* which eaſeth Pain, promotes the fall of the Eſchar, and reſiſts a Fluxion of Humours, Diverſions were made and his Diet order'd.

We dreſs'd him after two Days, and found two or three Pieces of Bone ſticking to the Lint. In the ſecond Dreſſing, I ſet the *Radius*, keeping it firm with little Compreſſes ſtiffen'd with Paſtboard: One of theſe-

theſe I put on the fore Part of the Arm upon the broken Bone, another on the inward, and a Third on the outward Part; making them all faſt with two Rollers, one above, and the other below the Fracture: This *Apparatus* kept the Arm ſtreight, and ſerv'd inſtead of a Defenſive. Over all we apply'd the Paſtboard, and ſupported the Arm with a Sling. The Suppuration was very moderate, and another Piece of Bone came afterwards away: We dreſs'd but once in two Days, and on the twelfth or fifteenth Day of the Wound, the Fleſh begun to cover the Bone, for which Cauſe, we dreſs'd only once in three Days, and that very gently and ſpeedily. Towards the twentieth Day, the Wound began to be fill'd up; the Defect of the *Cubitus* was made up with a *Callus*, and the *Radius* recover'd without Exfoliation, and all in four Weeks Time: After which, I only us'd a Roller on the fractur'd Place.

The good Succeſs, the Expedition and the Gentleneſs of theſe Cures ought, in my Opinion, to give ſome Reputation to this Way of Dreſſing: I have not ſeen ſince I firſt enter'd upon Practice, any Method follow'd, that has been either ſo ſhort, ſo eaſy for the Patient, or ſo certain in the Conſequence. Hereby theſe Pains are prevented which ordinarily bring *Fevers*, that are attended with many other Accidents, Abſceſſes, Fluxions and Inflammations are avoided, the Matter is but little, and that laudable, the wounded Perſon can take ſolid Nouriſhment and neceſſary Reſt; whereby all the Faculties become more vigorous, and Nature more active, Fleſh is more eaſily generated, and a *Callus* more ſpeedily formed: In ſhort, every Thing with more Facility re-eſtabliſh'd, and reduc'd to its former State.

Since the Beginning of the War, I have had under Cure very many whoſe Hands were pierc'd, torn, or half carried away by ſuch Fire-Arms as burſt, which is a Thing very common in Armies; many others have I likewiſe dreſs'd, that had their Hand ſhot thro' with Bullets, and cut with ſharp Inſtruments, which I ſhall not ſpeak of in particular. But I may juſtly ſay, that all thoſe I have dreſs'd in theſe latter Times, tho' by the Wounds the Part has been very much ſhatter'd and torn, have been always cu without loſing what remain'd of the M ber, and with little or no Diſcharge Splinters of the Bones, or Loſs of Fing or their Joints.

In this kind of Wounds, as well as others, I have avoided frequent Dreſſi and the Uſe of putrefying Medicines; A I own that I have ever found the Spirit Wine a very ſucceſsful Remedy in Woun of the Extremities, and in thoſe of nervo Parts. I have us'd it chiefly in Hoſpita where it always brought a ſpeedy Rel Many of the Ancients have order'd to ke open for ſome conſiderable time t Wounds of the Nerves and Tendons, give Vent to ſuch Matter, as by its Sa might corrupt the Subſtance of the Par But Experience has taught me, that t much more beneficial to the Patient in ſu Caſes, to hinder than to promote the Su puration, by doing betimes what is neceſſ ry to prevent Fluxions upon the Part: Som times applying good Defenſatives to th ſuperior Parts, to repreſs the Activity the Blood, and ſometimes uſing reſolvi Anodines to the Place afflicted, if there need to prevent or take off the Pain, fro which moſt commonly the Accidents pr ceed that attend ſuch Wounds; and guard off at the ſame Time the Attempts the Air, which is the greateſt Enemy of t nervous Parts.

I can aver, that by uſing this Method have cured ſuch Wounds much more ſud denly than I could any other Way; an ſince all are agreed that the Air is pernicio to Wounds in General, I believe none wi Queſtion but theſe of the Nerves recei thereby a more notable Prejudice than tho of any other Parts of the Body, conſide ing their Tenderneſs, the Nature of the Subſtance, and their Temperament. I lea it then to Conſideration, whether Woun of this kind could be defended from t Injuries of the Air, if they were kept ope according to the Opinion of the Ancients

But it will be ſaid, that 'tis extreme difficult, after all poſſible Precaution, avoid the Uſe of putrefying and irritat Medicines and Dilaters, in Cures that tedious; for if ſuch Things as breed Fl and are Balſamick be us'd, when at the

Fig: 45. For ye Suture of ye Tendon.

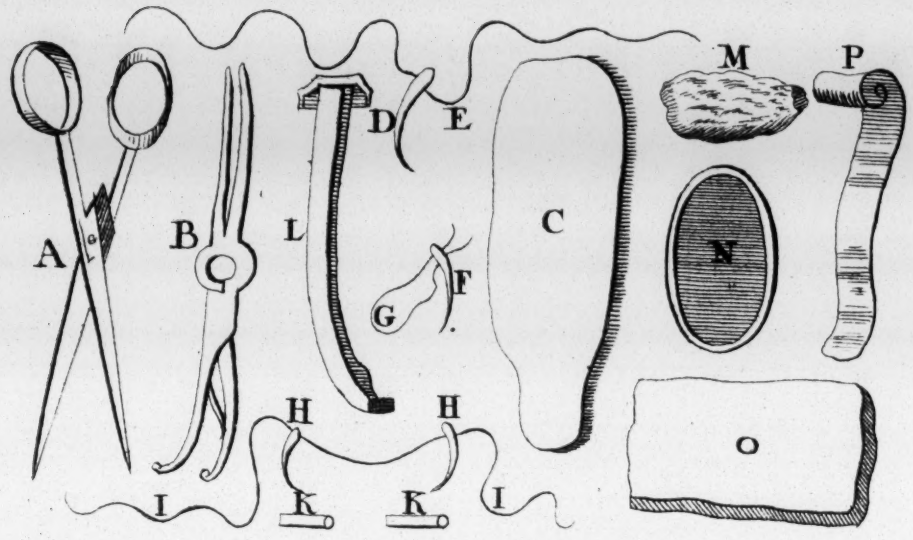


Fig: 53. Application of ye Seton.

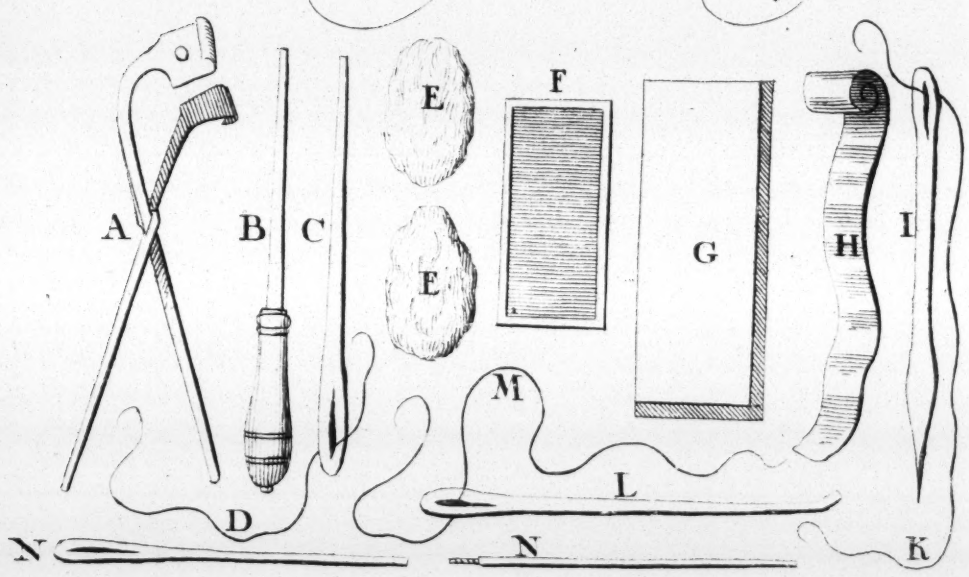
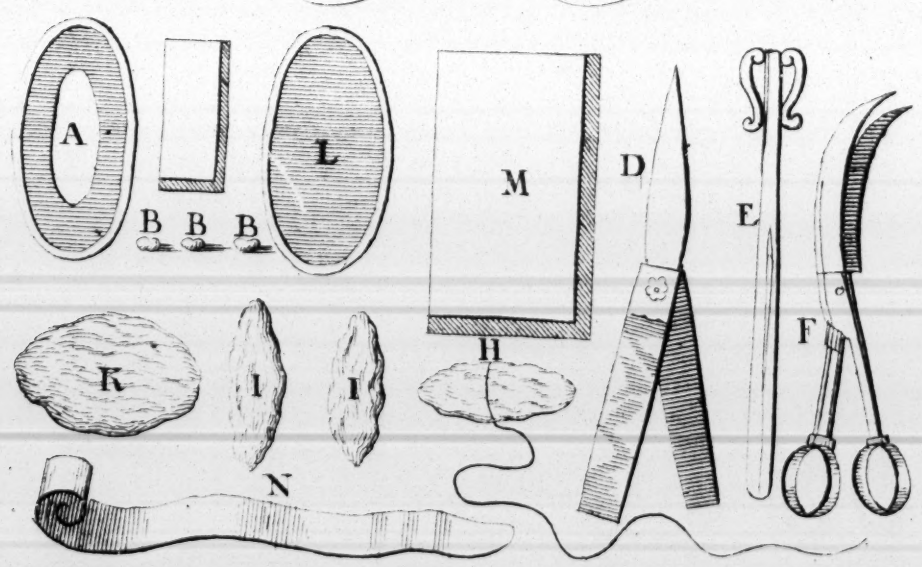


Fig: 54. Opening of an Abcess.



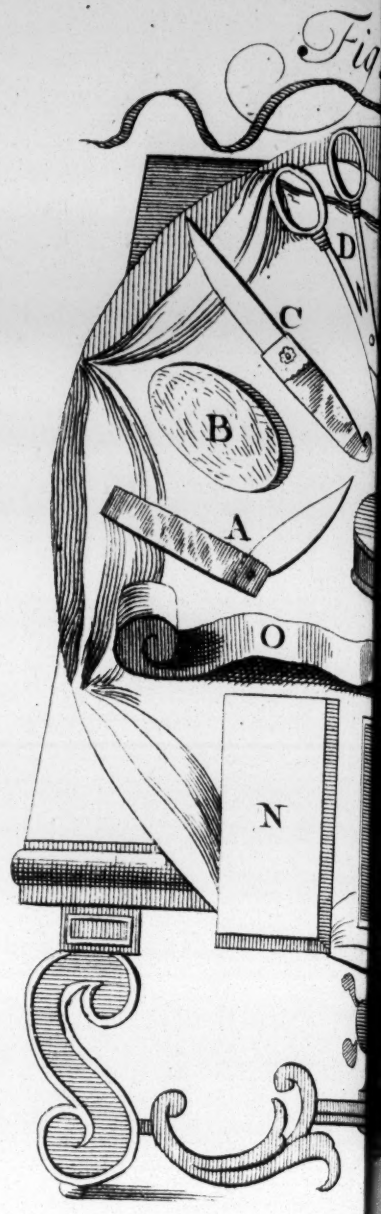
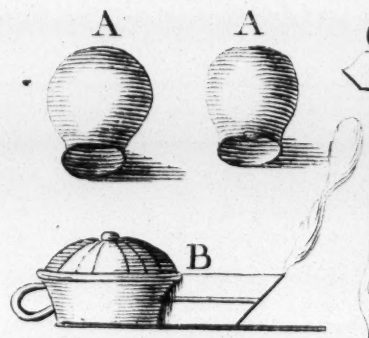
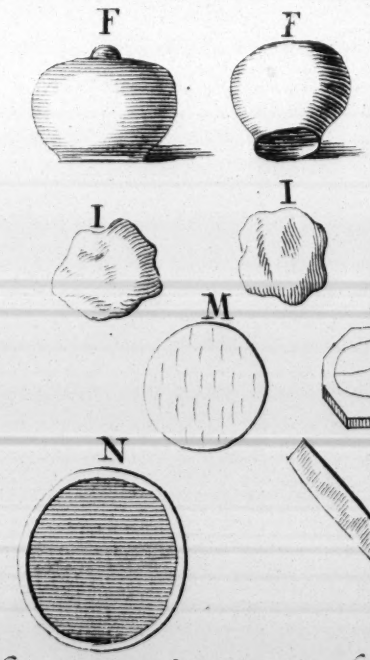


Fig: 57





Figures of Instruments, Bandages, Plaisters &c for ye Uses above from D

Fig. For Enkysted Tumours.

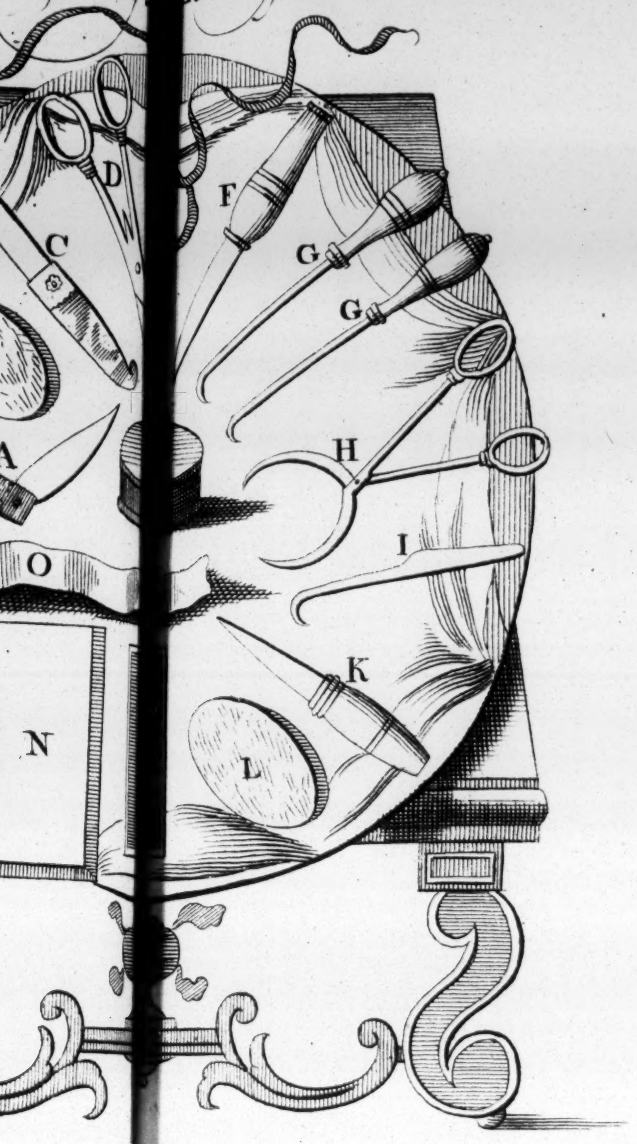


Fig: 56. Cauteries Issues &c. P: 345. Vol.

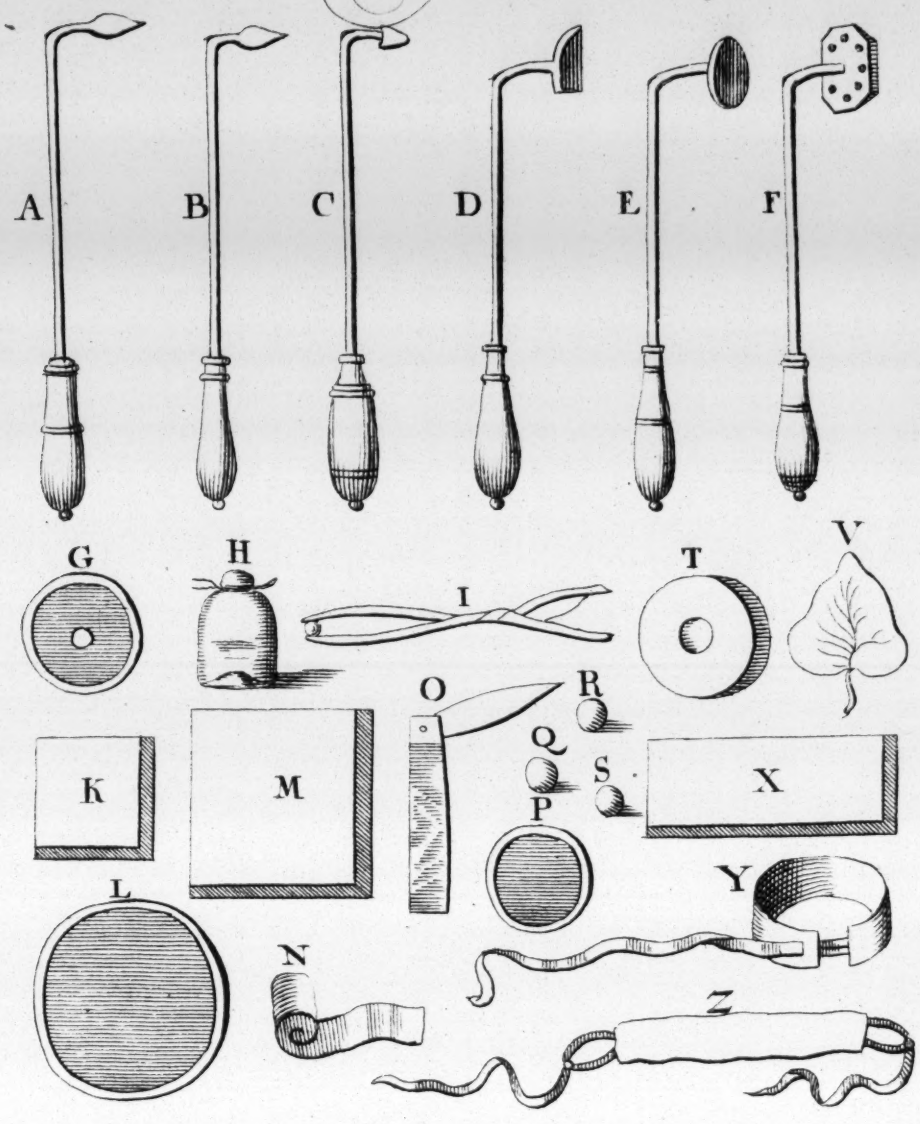
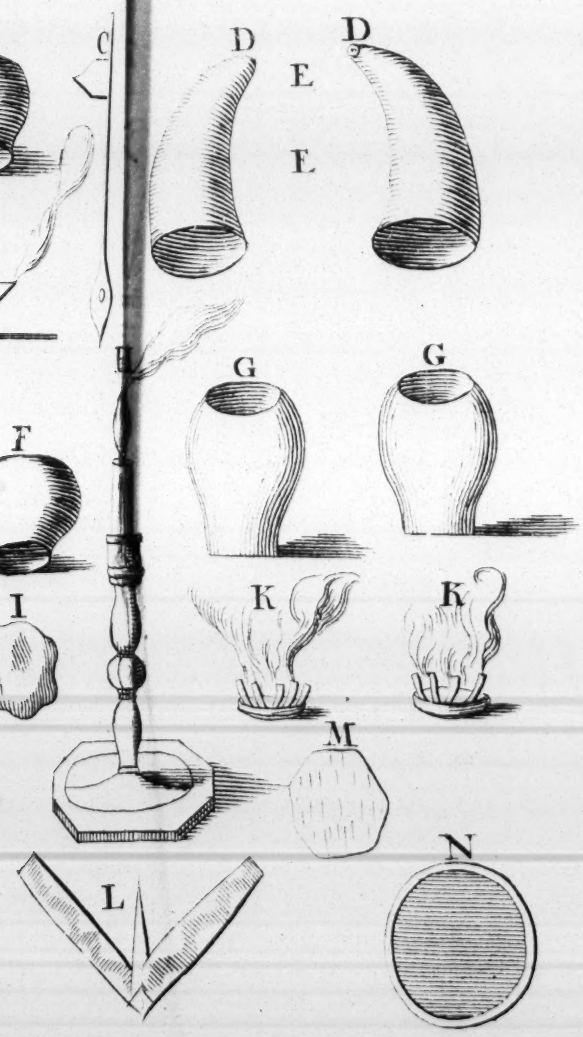
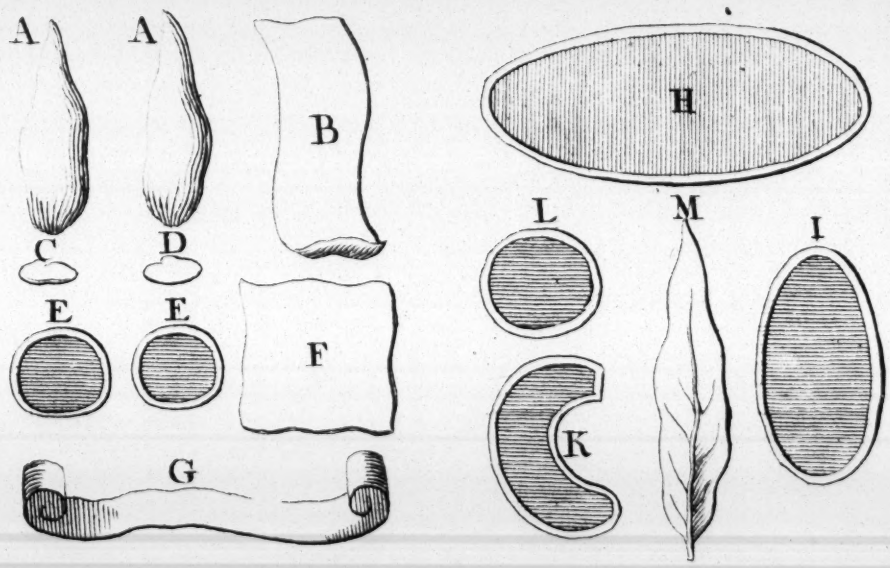


Fig: 57. For Cupping.



Leaches Fig: 58. & Blisters.



above from Dion. S^t Hillaire, Le Clerk. Etmuller. Vaugion &c.

e the Wound muſt be kept open, there be a Neceſſity of conſuming inceſſantly leſh with Cathareticks, which are very by the Pain they cauſe to produce ill dents, eſpecially in Parts ſo ſenſible as . Now to this I anſwer, That if ſup- ting and putrefying Medicines are us'd, almoſt ever infallibly follows a great uration, and ſometimes a total Diſſo- n of the nervous and tendinous Parts; ially if Tents or Dilaters be alſo im- 'd; which, if but for a ſmall time touch ſuch Parts, do oftentimes draw ncurable, and ſometimes mortal Symp- .

herefore, I have ever judg'd it beſt, to up the Wound as ſoon as poſſible on Occaſions, eſpecially when there is no neous Body that muſt of Neceſſity be n forth; or if all requiſite Diligence been already us'd at firſt Dreſſing to Intent. In fine, tho' I have always nly avoided with all poſſible Care the of putrefying Things, but alſo en- our'd to dreſs as ſeldom as might be, I affirm, that in this Way of Practice, never happen'd the leaſt Accident to at great Number of wounded Perſons was dreſs'd according to it, in our Ho- at *Brianſon*. *Pareus* ſhows, that by Method he ſucceſsfully cur'd the Prick- of a Tendon which King *Charles* the had receiv'd in Blood-letting, tho' in er Place he finds fault mightily with who uſe the Stitch to wounded Ten- He wou'd undoubtedly have been of er Mind, had he liv'd and ſeen, as I any others have done, how often the 'd Mr. *Bienaiſe*, an expert Surgeon, has m'd the ſame with Succeſs in his at *Paris*. But after all, we may ain that he is not the Firſt who has 'd the *Stitching* of a *Tendon*; for in Times it was uſual, and many of ncients have done it: And by and by treat of it from *Dion*.

he Year 1686, when the *Vaudois* were from the Vallies of *Luſerne*, one nd, a *French* Man by Birth, Serjeant Regiment of Guards, and at preſent cer in a Regiment of Fuſileers, being ded by a Bullet in the upper and out- Part of the right Thigh, and the Ball not to be found, was brought to the Hoſpital at *Luſerne*. He had lain a Night and a Day helpleſs upon the Ground, which occaſion'd a conſiderable Fluxion, and an Inflammation of the Part. I made large Inciſions, and ſpar'd no Pains to find the Bullet, but all in vain.

He was forthwith let Blood, and had a Clyſter given him, an exact Courſe of Diet being order'd: The Bleedings were repeated with the other Remedies for withdrawing the Humours from the Part. The Swelling and Inflammation were leſſen'd, and I began to think that Things were in a pretty good Condition: I kept in the Wound only a little Tent, about the Length of two Fingers breadth, very ſoft, and of pretty fine Lint. Thus the firſt Accidents were vanquiſh'd, but others more troubleſome and obſtinate, yet remain'd: For the Suppuration and Flux of Humours was ſo prodigiouſly great, that I verily believed his whole Body wou'd thereby have been diſſolv'd. At every Time we open'd the Wound to dreſs it, which was twice a Day, more than a Pint of Matter came away, beſides what was diſcharg'd between Dreſſings, which might be judg'd as much. In the mean Time, the Strength of the wounded Perſon was more and more impair'd, and his Body inſenſibly waſted away.

I cou'd aſcribe all theſe Accidents to nothing elſe but the Bullet, which remain'd in the Member, and this I rather inclin'd to think, in regard that almoſt all the Bullets that were drawn from Wounds during this Campaign were full of Sublimate or Glaſs, and many others of other Metal and Tin. I adviſ'd with Mr. *Coute* then at *Luſerne*, Surgeon in Ordinary to his Royal Highneſs, who being acquainted with the Order of Cure and the Symptoms, was of Opinion, that by Purging the Moiſture might be dry'd up; this was accordingly put in Practice.

I was eagerly deſirous to effect this Cure, as if all my Reputation had depended upon the Succeſs, and indeed it appear'd as if Providence had thereby deſign'd to open my Eyes, and to make uſe of me for the Relief of many others, I being qualified for that End by the Experience I attain'd in this In-

ſtance. The wounded Part was greatly diſorder'd by the Purging, in ſuch a Manner that I fear'd a Gangrene: The Fever was encreas'd, and the Patient had quitted all his Hopes, notwithſtanding the Aſſurance he had conceived of being cured under my Hands.

As for my ſelf, I began to deſpair, tho' it is my Humour never to give over my wounded Patient ſo long as Life continues; for his Thigh was all over livid, and the Spaces between the Muſcles, yea all the Member was fill'd and ſoak'd with Matter, which every Day encreas'd, the Wound being, as it were, an inexhauſtible Fountain. I conſider'd with my ſelf a Thouſand Times, if there was any Thing more that I cou'd do, or any Thing further to be us'd. I had perform'd all that Art preſcribes, to draw up that Matter, wherewith the Part was ever fill'd; having us'd not only a hard Bandage, with expulſive Compreſſes to hinder its gathering together and ſtay in the Part, but alſo ſudorifick Decoctions, but all in vain. I was alſo thinking to make a Counter-opening under the Thigh, to give a more free Courſe to the Matter, and to hinder its Stay; but on ſecond Thoughts, I believ'd it would be to no purpoſe.

Mr. *Coute*, and generally all who ſaw the Man, deſpair'd of his being cur'd; and told me, that I vex'd my ſelf in vain, as if all my Reputation had depended upon the Cure: Tho' I had hitherto try'd all Sorts of Means, yet I was obſtinately bent to find out ſome other Way, by my own Conſideration, ſince the wounded Perſon himſelf was alſo deſperate. As I have formerly ſaid, I had hitherto kept in the Wound a little Tent, about Two Fingers breadth long, and very ſoft. This I reſolv'd altogether to lay aſide, and to dreſs the Wound with a Pledget and Plaiſter only, and ſuch a Bandage, as might be ſufficient to keep them on. This frighted the Poor dying Man, and it was with great Difficulty that now I cou'd obtain his Conſent to have that Power over him, which of Right belong'd to me, and what formerly he had ſo freely granted.

In the Evening, to my great Surpriſe, I found him in a much better Condition: The Matter came not away in ſo great a Quantity that Night, he ſlept much bett[er] than he had ever done ſince he received h[is] Wound; and in the Morning I found hi[m] yet better: This Evening the Matter bega[n] to be of a good Conſiſtence, and to be di[s]charg'd in a moderate Quantity; henceforward I dreſs'd but once a Day. His Feve[r] which had continued from the Beginning left him altogether, and the ſecond Day after the leaving out of the Tent, and from the Fourth, he was dreſs'd only once every other Day. He alſo began to eat, and recover his Strength. From the eighth Day nothing farther came from the Wound; and on the Twelfth, after the Diſuſe of the Tent, he was entirely cured. To the Truth of which, I call God to Witneſs.

This is the Cure, as I ſincerely proteſt, to which I have been moſt oblig'd: It was this which made me embrace that Method which now I expoſe to publick View, and which from this Time forth ſucceeded ſo happily with me: And it is certain, I had infallibly cur'd my Patient at once of all his Diſtempers, if I had continued but only for ſeven or eight Days to uſe a Tent, tho never ſo ſmall and ſoft. From this Time forward I reſolv'd to abandon the Uſe of Tents, and to give my Advice in this Affair to the Publick, when once an Opportunity ſhould preſent it ſelf. I communicated my Deſign to Mr. *Thouvenot*, Phyſician in Ordinary, and Chief Surgeon to their Royal Highneſſes, a Man of great Learning and Experience, to be eſteem'd as well for his profound Knowledge, as his eminent Virtue, and having related to him a Deſcription of the Cure, he confirmed me in my Opinion.

It was here therefore, in the King's Hoſpital ſettled at *Brianſon*, that I drew out ſeveral Obſervations which I had made, and ſome Accounts I had kept of many Cures done in different Times and Places, in order to make up a Collection of them, together with ſome others done in this Hoſpital. But to return to the preceding Cure, it is convenient to obſerve, that tho' the Bullet was lodg'd in the Member, yet no Diſadvantage did thereupon enſue to the Patient. Which made me think for a time, that the Bullet hitting upon the Belly of ſome large Muſcle, might have rebounded the ſame

Way by which it enter'd. But I found my ſelf out in my Calculation: For being at *Turin* about a Year and half after this Cure, I was ſent for from the Citadel where I ſtay'd, and when I came, I found this ſame Perſon whom I had cur'd of his Wound, who ſhew'd me a little Abſceſs that was form'd upon the old Scar. I open'd it without Difficulty, and perceiving ſomething white and hard, with my Inſtrument I drew out the Bullet, which was flat, with a Piece of the Thigh-bone ſticking to it: The Ulcer was quickly cur'd without any Inconvenience, and never return'd again.

Had I at firſt Dreſſing found out the Bullet, to the Misfortune of the wounded Perſon, I ſhou'd have been oblig'd by Cuſtom and the Rules of our Art to draw it forth, tho' it had been, as indeed it was, ſticking in ſuch a Part of the Bone, as was encompaſs'd with the greateſt Depth of Fleſh. But for certain, it could not have been got out with ſuch Eaſe, or without Pain and grievous Irritation: Beſides, I queſtion if the Patient who was of a bilious Conſtitution, cou'd have born up under ſo tedious and painful an Operation; ſeeing an infinite Number of Accidents had been occaſion'd only by the Touches of a little and very ſoft Tent. Wherefore I am perſwaded, and am bold to affirm, that it is not always neceſſary to draw forth the Bullet, when it is lodg'd in a Bone that lies deep under the Fleſh: Nature that is much wiſer, has more gentle and eaſy Ways, and beſt knows the Time to free her ſelf of what is hurtful to her.

Hippocrates, in the Fifth of his Epidemicks, relates that he drew forth the Head of an Arrow from the Groin of a Man, after it had remain'd ſix Years in his Body, without any Accident happening: During all that Time, *Alexander Benedictus* reports, that a certain Man was wounded in the Back with an Arrow, the Head whereof could not be got out being bearded, and Two Fingers breadth in Length; which yet, two Months after the Wound was cured, the Patient voided by Stool. *Hildanus* in his Sixth Obſervation tells, that he took out the Point of a Knife, which had remain'd two Years among the acute Proceſſes of the *Vertebræ* of the Loins, without producing any Accident there. Let us now therefore acknowledge, that Nature is wonderful in her Operations! Theſe Examples, together with my own Experience and Reaſon, have made me very cautious in the drawing forth of Bullets, when they are not lodg'd in Places where they may ruin or quite deſtroy the Action of any Part, or in Danger of falling into ſome Cavity.

This Cure is of it ſelf enough to convince any one of the Advantage; and to eſtabliſh the Credit of my Practice, it having been publickly perform'd, yea authoris'd and approv'd by many learned Phyſicians and skilful Surgeons in the Court of *Savoy*: Since that Time, I have in ſeveral Places, and many Hoſpitals, cured a great Number, who have had their Thighs pierced quite thro', without either Tents or Dilaters, ſave only on the firſt Dreſſing, for ſupporting and containing the Aſtringents neceſſary to ſtop the Bleeding. This is contrary to *Pareus* his Method, who in his Book of Wounds affirms, that Wounds of the Thighs and Legs ought to be kept long open, that the corrupted Membranes may have Time to ſuppurate and come away: As if Nature that has brought ſolid Bodies, ſuch as Iron, Bullets, Bones, *&c.* to the Orifices of Wounds, even after they have been a conſiderable Time cicatris'd, as hath been formerly obſerv'd, were not of ſufficient Power and Segacity to expel ſome Shreds of corrupted Membranes. But to avoid corrupting of the Part, the Wounds muſt be ſpeedily clos'd up: *Tents* and *Dilaters* laid aſide, the Air muſt be carefully excluded from the wounded Parts; great Suppuratives caſhier'd, and we muſt dreſs as quick, and as ſeldom as poſſible.

In the Year 1691, when I was at *Pignerol*, a Captain of a Battalion of the King's Regiment commanded by Mr. *de Launay*, was wounded in the right Knee with a Bullet, which went in at the outward and middle, and came out at the inward and upper Part thereof. He was dreſs'd for whole Months by a Surgeon of the Army, very well skill'd in his Imployment, but who follow'd the common Method: He had alſo adviſ'd with the Surgeon-Major of *Pignerol*, who had given over Hopes of the

Cure. The Surgeon that had him under Hand, not thinking to make any long ſtay in this City, propos'd to me, after ſo long a Time to undertake the Care of Dreſſing him, which I did, and found five or ſix Holes in his Knee, all of them fill'd with Tents, that were hard and long enough to reach to the Bottom. His Leg and Foot were ſwell'd, his Body very thin, and he had a ſlight Fever, which had never left him from the firſt Time he received his Wound, with perpetual Watchings, and a Loathing of all kind of Food.

I began to leave out all the Tents, and with a ſmall Inciſion at the loweſt Part thereof, I dilated the Wound; I laid aſide the Aromatick Wine that had been ſo long us'd to no Purpoſe, and left off the Uſe of a certain Injection, which being apply'd twice a Day, by the intollerable Pains it occaſion'd, had mangled all the Joint, and caus'd a Communication amongſt all the Holes, which were exactly ſtop'd with the Fingers every time that Medicine was imploy'd, that it might make ſome ſtay in the Part. I dreſs'd him indeed with the Remedies that had been formerly us'd; but I took Care to apply them more conveniently, and to accommodate them better to the Nature of the Part and the Wound.

When I came to ſee him the Day following, ſo ſoon as he ſaw me, he embrac'd me, and ſwore in the Preſence of many Officers, that he was inexpreſſibly oblig'd to me; and, which was no leſs ſurpriſing than true, he told me he ſlept all Night, tho' he had not done ſo ſince the firſt Day of his Wound: That he felt no more Pain in his Knee, and believed his Fever was gone. He was ſo encouraged with this good Succeſs, that from that Time forth he thought himſelf as good as cured. For five or ſix Days, he was dreſs'd after the ſame Manner once a Day, and after that once every other Day; without changing the Ointments and Pluiſters which had been ſo long us'd before, without any Advantage. The Cure was compleated in leſs than a Month: After which I adviſ'd him to go into his own Country, there to uſe the Waters, in order to ſtrengthen the Part that was weakened by the frequent Dreſſing, and if poſſible, to enable him freely to extend it.

It appears by this Cure, that a good Method is the moſt effectual Remedy and principal Inſtrument in healing Wounds. If any Man will be but at the Pains to weigh this Caſe, I doubt not but he will be convinc'd, that the Tents, the Injection, and the other humid Things wherewith the Part was perpetually moiſten'd, were the Cauſe of the deplorable Condition of the Wound. Now if ſuch a Thing, as it often falls out, had happen'd to a Common Soldier under the Neceſſity of being ſent to an Hoſpital, and treated in the common Way, he muſt have endur'd Twenty Deaths by the tedious and painful Dreſſings: Nay, it is certain, he cou'd never have held up under them; being at the ſame Time depriv'd of all neceſſary Conveniences, breathing in an unhealthful and corrupted Air, and having Food neither ſo Nouriſhing, nor given him at ſuch ſeaſonable Times as a Captain might, who was willing to ſpare nothing that might conduce to the Preſervation of his Life.

The Account I have given of this Cure, has nothing in it that is not exactly conformable to the Truth. The Patient himſelf made the ſame Relation to Mr. *Goiffon*, a very learned and experienc'd Phyſician of *Lyons*, and chief Phyſician of the King's Armies in *Italy*. 'Tis true, the Wounds of the Joints require very great Care, there being few but what are liable to more troubleſome Accidents, and when the Part is much ſhatter'd, they are judg'd mortal. However, I am very certain that great Abuſes are committed in the Manner of Dreſſing them; and this I thought my ſelf oblig'd not to conceal. The Joints moreover are nervous or tendinous Parts, and are known to be of a cold and moiſt Temperament: Wherefore they muſt be guarded from the Attacks of the Air, they muſt not be exaſperated by the Touches of Tents and Dilaters; and putrefying Medicines muſt be ſuppreſs'd, becauſe they weaken the Parts to which they are apply'd, and ruin ſuch as are Nervous and Tendinous.

All theſe liquid Things which are commonly uſed, are hurtful to the Joints; ſuch as Aromatick Wines, Fomentations, Injections, *&c.* Such Things as are healing and drying

drying are profitable, we muſt endeavour to hinder the Waſte of the Spirits, and ſeaſonably to perform the neceſſary Diverſions, obſerving a drying and ſlender Diet, and uſing to the Wound Sarcotick Medicines, ſuch as Balſams, or Spirit of Wine, avoiding alſo long and frequent Dreſſings. If this Method is followed, all the Accidents, which ordinarily accompany Wounds of this Nature, will be prevented.

Fabricius ab Aquapendente treating of Wounds in the Joints, ſays, that they are not only extreamly hard to be cured, but alſo dangerous and mortal; and he adds, that the Cure is dangerous and difficult, both in regard of their own Eſſence, and alſo that of the Joints: For Nature being the Cauſe that produces Fleſh, and fills up Wounds, is leſs vigorous in the Joints, which are cold in Temper, and deſtitute of Blood and Fleſh, than elſewhere, eſpecially when weaken'd yet farther by a Wound. Afterwards in the ſame Chapter, being ſupported by the Authority of *Galen*, in his Third Book of Fractures, he affirms, that whatever lies under the Skin, is advantag'd by being cover'd therewith: And conſidering that the Joints are cold without Blood and without Fleſh, he ſays, that their natural Heat is ſoon extinguiſh'd, eſpecially when expos'd to the Cold of the Air. Theſe were the Thoughts of this Author. He further adds in the ſame Chapter, that Wounds in the Joints ought not to be left open or expos'd to the cold Air, becauſe thereby we run the Hazard of quenching the natural Heat, and of a Gangrene: Or if this ſhould not fall out, there is ſeldom any Digeſtion in the Wound, when ſo treated.

Theſe Parts then, as hath been ſaid, are naturally very weak, deſtitute of Heat, and plentifully water'd with Moiſture; which by reaſon of the abounding Salts, is apt to contract an Acrimony and Maligmity; eſpecially when it is retain'd in the Part with Tents. Now this ſame Moiſture inſinuating it ſelf into the Pores of the nervous Fibres, fails not to harden them, and render them callous; from whence it comes that theſe Wounds often End in *Fiſtula's*. 'Tis obſervable alſo, that if there happen any Change or Diſorder in the Blood, this Humour becomes ſo corroſive, that it rots the Bones, and deſtroys the Parts where it comes. Long and frequent Dreſſing likewiſe occaſions the like Accidents, becauſe of the Admiſſion of the Air that encreaſes the Force of the Acids, and eaſily deſtroys that ſmall Portion of Spirits and Heat with which theſe Parts are furniſh'd.

All theſe Things are of the greateſt Importance, and well deſerve our ſerious Conſideration; and if Reaſon in any Thing ought to prevail over Cuſtom, 'tis chiefly here, where the Life of Mankind is concern'd, which is a Thing ſo precious, that it very well merits our moſt particular Care. And indeed, I am of the Mind, that the Authority of ſo famous a Perſon as *Fabricius ab Aquapendente* ought to give ſome Reputation to my Opinion. Beſides, I do affirm that if Wounds in the Joints are hard to be cured, and often degenerate into *Fiſtula's*, this is not ſo much owing to the Weakneſs of theſe Parts, as to the Manner us'd by moſt Surgeons in dreſſing them.

One *La Grandeur*, who was in the Guards afterwards of the Marſhal *Catinat*, being at the Siege of *Luxemburg* in the Year 1684, had received a Wound with the Shiver of a *Granade* in the left Leg, which turn'd to an Ulcer near the inward Ankle, that had baffled the Care of the Surgeons. This Man being at *Pignerol*, about the beginning of 1692, took a Reſolution to have this Ulcer cur'd, tho' it had been of a pretty long Standing, and was to him inſtead of an Iſſue. Here he finds a Surgeon pliant enough, who without foreſeeing what Accidents might follow, or conſidering the evil Diſpoſition of Body, and the bad Conſtitution of the Patient, takes him in hand, dreſſes him, and heals up this Ulcer. But in a little Time after, he had ample occaſion to repeat the Raſhneſs of his Undertaking: For the impure Humours of that unwholeſome Body, which had taken their Courſe that Way, not finding any Outgate, were by Degrees gather'd together in the Member, and by their Stopping there, arriv'd at a Pitch of Malignity ſufficient to cauſe a Gangrene.

On the midſt and inward Part of the Leg, there aroſe a Tumour, or Swelling, which

was

was forthwith taken by his Surgeon, who had very little Underſtanding in ſuch Caſes, for a *Phlegmon*; whereupon, without further Deliberation, he begins with Bleeding, which he repeated five or ſix times. The Humour retain'd in the Part, not being able to come to a perfect Concoction, becauſe of the Defect of Heat and Spirits, made its Malignity appear, and corrupted a great Part of the Leg. The *Gangrene* appear'd, and the Surgeon made an Opening in the higheſt Part of the Tumour, from whence came forth a little fœtid *Lympha*. But the Diſeaſe encreaſing every Moment, both the Patient and the Surgeon were alarmed, and ſought out for ſome Body to adviſe with about cutting off the Member. I was ordered by the Marqueſs of *Champlats*, who was then at *Pignerol*, to go ſee him, and to employ my utmoſt Care to retrieve him if poſſible from that miſerable Condition. I made Inciſions in his Leg from the Knee to the Ankle on the Inſide, and touch'd it with a very piercing Spirit ſo far as the *Gangrene* reach'd. I ordered inwardly the ſtrongeſt Cordials, not forgetting Oriental Bezoar and Generous Wine, which I caus'd him to drink from Time to Time.

Three Days paſs'd over, in Spight of all I could do, before a Stop was put to the Progreſs of the *Gangrene*, the unſeaſonable Bleedings, his Diet, Fever, and the other Evils with which he was oppreſs'd, had ſo impaired his Strength, that nothing could be hoped from it. Nevertheleſs I judg'd no Way would be more compendious and effectual than that of Sweat to reach the Root of the Evil, and to eaſe Nature overwhelm'd with a World of Impurities; wherefore I did my Endeavour to procure it, and for that Purpoſe made him take one Evening a gentle Sudorifick. This Remedy had all the Succeſs I could expect: The Patient ſweated a little that Night, which forthwith put a Stop to the *Gangrene*. The Eſchar came away but very ſlowly, becauſe of the Weakneſs of the Patient; but when this was entirely ſeparated, another Accident ſuperven'd, which threw us into a new Perplexity; for a large Tendon that had been alter'd by the *Gangrene*, and was waſted by the Suppuration, being join'd to its Original by a ſmall Portion only, drew after it the Matter, and notwithſtanding all our Care, form'd a v[e]ry conſiderable Abſceſs under the Joint of t[he] Knee, which encreaſing by little and lit[tle] overſpread all the hinder Part of the Thi[gh].

I dilated the Wound, making a freſh I[n]ciſion, wherein I put a ſmall Dilater to hi[n]der its cloſing up. I us'd this Dilater ſeven or eight Days, in which Time t[he] Matter encreas'd, the *Sinus* was enlarg'd, a[nd] the Thigh ſwell'd and became painful. I reſolv'd then to find the lowermoſt, or mo[ſt] depending Part, that I might there make a Counter-opening, whereby to give a Paſſage for the Humours, and to hinder their Abo[de] in the Part; ſo I made a Mark without on the Place I pitch'd upon for that Operation. Nevertheleſs I was willing firſt to try all other Means I could think on; and accordingly I begun to leave out the *Dilater* which I had only kept between the Lips of the Wound, not ſuffering it to paſs into the Cavity of the Ulcer; and thus I dreſs'd the Wound only with a Pledget and a Plaiſter, and ſuch a Bandage as might keep them on. The next Day very little Matter came away, and the Day after that yet leſs, the Swelling and Pain of the Thigh were diminiſh'd, the large and deep *Sinus* was fill'd up in four or five Days. Thus the Operation I deſign'd was prevented, and the Patient cur'd in ten or twelve Days after.

'Tis no Wonder that very many able Surgeons have been deceived without diſcovering it, in the too frequent Uſe of theſe fatal Inſtruments, *Tents* and *Dilaters*; for I, who had bid them open Defiance, could not keep my ſelf from being miſtaken in uſing them; and indeed he muſt be a capital Enemy to them, and have experienc[ed] their pernicious Conſequences, who can imagine that a Thing ſo ſmall as his Tent was could occaſion ſuch conſiderable Accident[s]. I was much amaz'd at this Event, and there by confirm'd in my Averſion for *Tents* and *Dilaters*, reſolving then to uſe more Caution than ever, if I ſhould at any Time be neceſſitated to uſe them.

I willingly own, that the Collection of Matter under the Thigh was not occaſion[ed] by the *Tents*. They are not always the Cauſe of Impoſtumations, nor of the Accidents that follow: But after all, their Uſe contributes much to delay the Cure, and to ren-

nder the Symptoms more obſtinate, as may e ſeen by the preceding: For after the idening of the Sore, a free Paſſage being iven, the Matter would have been diſcharg'd inſenſibly, and without Intermiſſion, if it ad not been hinder'd by the *Dilater*, which, ow little ſoever, was yet ſufficient to ob-ruct its Paſſage. I hope then I ſhall not e thought to have acted without Ground n doing my Endeavour to put down the Uſe of *Tents*, ſince it is attended with ſuch ernicious Conſequences. 'Tis eaſy to judge, hat if a *Dilater*, about the Size of a Bean, as able to occaſion ſuch troubleſome Symp-oms, a long and thick one muſt have caus'd uch more Irritation and Diſorder. If I ad continued to uſe that extraneous Body et eight Days longer, it would have brought n a new Mortification, which at that Time ight have laid the Patient in his Grave, onſidering the deplorable State he was re-uc'd to by his former Diſorders.

When I was at *Laſerne*, in the Year 1688, Soldier of the Train-Bands was brought o the Hoſpital there, who had received a hot in his Right Foot, that was pretty re-markable for the Way of the Bullet, which as of a very ſmall Size. It entered at the ward and middle Part of the great Toe, d came out at the End of the little one, o Excoriation appearing either above or be-w. The firſt and ſecond Bones of the eat Toe were broken, the ſecond of the ree next were entirely cruſh'd to Pieces, d the laſt of the little Toe in like Man-er.

When we parted the Toes one from ano-er, a great many little Pieces of Bone were be ſeen, which ſeem'd only to hang by a hread. I firſt ſet every Bone to rights by elf, and afterwards ſet them in Order e with another. Between every Toe and Fellow, I gently ſlip'd in a little Piece Linen dip'd in Spirit of Wine; and I ade ſmall Compreſſes, pretty hard and ngiſh, which I put above and under the oes, in Form of Splinters, being wet alſo ith Spirit of Wine. I wrap'd all up in nen, without Ointments or Plaiſters, and pported the Foot with a Stool, ſuſtaining with an eaſy Bandage.

I took off the Dreſſings after two Days, d without removing the little Pieces of Linen between the Toes, I fomented all the Part with the Spirit of Wine, and dreſs'd it as before. The Suppuration was but very ſmall; and indeed it was with Deſign to prevent it that I uſed nothing but the Spirit of Wine, which was the only Remedy I employed to compleat the Cure. This was effected in about three Weeks Time, without the coming away of the leaſt Bit of the Bones, though they had been entirely ſhatter'd to Pieces.

All Experience aſſures us, that 'tis Nature and a good Method that effects the Cure, and not at all either the great Labour or vaſt Charges beſtowed upon it. If I had uſed in this Caſe the ordinary Ointments, and putrefying Medicines, they would have occaſion'd a plentiful Suppuration, whereby the Splinters of the Bones had been looſen'd and brought away, the Cure had been delay'd, and poſſibly the Toes loſt, which had been enough to make the Patient lame all his Life.

Though this Cure is not of great Conſequence, yet the Conduct therein uſed may ſuffice to ſhew, that the Bones do eaſily enough reunite, when they enjoy the neceſſary Repoſe, when the Air has no Time to alter them, or to exert its Efficacy in the Wound, and when the Uſe of ſuppurative Remedies is laid aſide, which are ever hurtful, as has been already obſerv'd; and I will here add, as to the laſt mentioned Medicines, I know no Kind of Wound, in what Part of the Body ſoever, that does abſolutely ſtand in need of them.

Of the Suture *of the* Tendon. *From Fig.* 45. *of the Eighth Demonſtration of Chirurgical Operations. By Mr.* Dionis, *Chief Surgeon to the preſent Dauphineſs.*

'TIS on the Hand that the *Sutures* of the *Tendons* are moſt frequently practiſed, becauſe that Part is wholly full of theſe nervous Organs, deſtin'd as well for the Direction of its Motions, as thoſe of the Fingers. This Part of Man alſo ſerving as a Sort of Buckler againſt whatever attacks him, it conſequently receives more Wounds than

than the others, which don't ſo frequently ſtand in need of the Operation of which we are ſpeaking. When Mr. *Bien-Aiſe*, one of the moſt famous Surgeons of *Paris*, began the Performance of this Operation about fifty Years ago, it paſſed for his Invention, of which he reap'd all the Honour, and all the Charms of Novelty; but on Examination it appearing that it had been talked of above Two thouſand Years before he hit on it, it was then diſcovered that he only revived an ancient Practice of the *Greeks*, and that *Guido* and ſeveral others had practis'd it. 'Tis indeed true, it was grown obſolete, and he brought it into Uſe again; and we are obliged to him for having it tried on his Dogs, after that employed it on Men, and then encouraging us to the Performance of an Operation which prevents the laming of a great many wounded Patients.

He performed the Suture of the Tendons in old as well as green Wounds, that is, in thoſe of fifteen or twenty Days, but not on thoſe which were perfectly cicatrized, as ſome would perſwade us, it being in that Caſe impoſſible to bring the Ends of the Tendons near one another, they being agglutinated and united to their neighbouring Parts. The Tendons are not ſo eaſily ſewed up as other Wounds, which only require the drawing their Lips together, and uniting them by the Help of a threaded Needle; but in Wounds of the Tendons, the Stitching is to be preceded by an Inciſion, in order to ſearch out one of the Ends of the Tendon, which is always faſten'd to the Body of the Muſcle, for that which ſticks to the Bone it ſcarce ever ſeparates. For Inſtance: In caſe of a tranſverſe Wound on the Back of the Hand, which has cut the extending Tendon of the middle Finger, if the Wound be either recent or old, the Operator is to begin with making a ſmall Inciſion longways with the Point of the Sciſſars *A.* at the upper Part of the Wound, to ſearch out the End of the Tendon, which the Body of the extenſory Muſcle has drawn upwards, and with the Forceps *B.* to pull it down, and bring it to the other End, in order to perform the Suture; and to facilitate this Approximation, we are to keep the Hand extended on a little Palate *C.* which we are to faſten to the Palm of the Ha to keep it continually open.

Authors propoſe to us Two Ways of p forming this Suture. The Firſt is with Needle *D.* threaded with a ſingle wa Thread *E.* run through one End of Tendon from without inwards, and throu the other from within outwards, maki but one Stitch, and tying the two Ends the Thread on a ſmall round Bolſter. T *Suture* is ſooneſt perform'd, but is by fo diſliked, they alledging, that the little B ſter on which the Knot is faſten'd, depriv us of the Power of ſeeing whether the t Tendons are well join'd together; and the fore they prefer the other Way, which to make Uſe of the Needle *F.* threaded wi the double Thread *G.* in Form of a Loo as uſual in the Feather'd *Suture*, and anoth betwixt the two Threads, on which t Knot is to be made. Betwixt theſe t Bolſters we ſee whether the two Ends of t Tendon are well united, and are certa that the Patient cannot be lamed, if t two Ends cicatrize in this Manner.

There is a Third Way which I have ſe practiſed by Monſieur *Bien-Aiſe*, which me ſeems more ſecure than either of t former. 'Tis with the two Needles *H. H* threaded with the ſame Thread *I. I.* bot which are to be run through on the Side eaca other from without inwards, and the repaſs'd from within outwards through t other End of the Tendon, and to be ty'd o the little Bolſters *K. K.* when we find t Extremities ſufficiently approximated. Wha ought to give the Preference to this Way i that two Threads better unite and rejoin t Tendon than one only, and conſequently the Cloſure is thereby more eaſily made.

In the Performance of this *Suture*, we ar to make Uſe of little round Needles, tha the Orifices we make in the Tendon be ver ſmall, the flat ones making them too large In piercing the Ends of the Tendons, w are to ſuſtain them by the End of the curve Tube *L.* and take Care that the Thread b wax'd, and ſo fine as to run eaſily through the Paſſage made by the Needles, without obliging us to pull it hard or force it thro Alſo, when we knot or faſten the Thread we are to force the Ends of the Tendon a little

little over one another, that they may not separate, tho' the *Suture* ſhould ſomewhat ſlacken by the ſlow involuntary Motion which the Muſcle may produce. The *Suture* thus finiſh'd, we are to lay over it the Bolſter *M.* cover'd with *Arcæus* his Balſam, or that of *Peru*, if to be had; then, after laying on the Plaiſter *N.* we are to add the Bolſter *O.* all which are to be faſten'd by the Band *P.* to be circularly roll'd about the Hand. The Reaſon of the Uſe of Balſamicks in theſe Caſes, is to prevent the too great Suppuration of the Wound; and above all, we are to keep the Palate *Q* under the Hand until the Wound is perfectly cicatrized. After cicatrizing there ſometimes remains a little Calloſity on the Suture, which is to be rub'd over with a little Oil of Sweet Almonds, or of Earth-worms. The Surgeon is to bend the Hand by little and little, and inſenſibly bring it to the Performance of its proper Function without Violence, cauſing the Patient for ſome Time to wear a Sort of Mitten, to defend his Hand againſt the Cold.

There are uſually Four different Operations perform'd on the Fingers: The Firſt of which is the Separation of thoſe join'd together; the Second the ſtraitning thoſe which are crooked, or ſtand a little bent; the Third the opening the *Panaris*, otherwiſe call'd the *Paronychia*, the Felon, or Whitlow; and the Fourth the Extirpation of bruis'd or gangren'd Fingers. The Fingers are two Ways join'd together, either by Union, or Agglutination. What we call Union, is when the Child at its coming into the World has its Fingers join'd to one another, which, from the firſt Formation, proceeds from the Diſpoſition of the Matter, or the Force of the Mother's Imagination, as do ſeveral other Ills which Children bring with them into the World. If after Ulcers, or ſome violent Exuſtion or Burn, in which the Skin of the Hand being wholly flay'd off, the Fingers ate negligently ſuffer'd to ſtick and join together, this is call'd an Agglutination.

Both theſe Accidents are to be remedied by the Separation of the Fingers with a Penknife, or the like Inſtrument, taking Care withal, that we do not take any Thing from one, and leave it to the other. If the Union is perfect, that there is little or no Space betwixt them, the Surgeon is to ſhew his Dexterity in patiently and ſlowly cutting that only which joins them together; but if they are only join'd by a Membrane, like a Gooſe's Foot, he is betwixt each two Fingers to cut off and take away the Membrane which joins them, that after they are cicatriz'd, there may remain nothing which can poſſibly interrupt the Performance of their Functions.

When the Separation is made, we are to hinder their Agglutination afreſh; in order to which, we are to put ſmall Bits of Linen betwixt the Fingers. We may make Uſe of a Bandage call'd the Gauntlet; but that being very long in fixing, by reaſon that we are with a Band of five Ells long to roll each Finger ſeveral times round one after another, we therefore chuſe to make Uſe of ſeveral ſmall Linen Fingerſtalls, dip'd in a vulnerary Water, or ſome other Deſiccative, and of a Band, which is to be roll'd circularly about each Finger.

A Hand is very much diſigur'd by bent and crooked Fingers; beſides which, 'tis alſo very incommodious and uneaſy to the Perſon which has them, by reaſon that not being able either to extend them ſtrait or bend them, he is unable to help himſelf on ſeveral Occaſions, and though he can in ſome, 'tis yet but very lamely and aukwardly. If the Surgeon is apply'd to in order to help this Deformity, and endeavour to enable one or more crooked Fingers to perform their ordinary Functions, he is to examine the Diſpoſitions in which he finds the Fingers, before he promiſes any Cure, or begins to attempt it; for they may be ſo diſpoſed that 'tis impoſſible to redreſs them. If the Indiſpoſition is an *Anchyloſis* in the Joints, he is to ſoften it by bathing it in Tripe Broth, or rubbing it with Ointment of Marſh-mallows, or other emollient Herbs. If by an ill managed Cicatrizing the Finger is depriv'd of its Uſe, 'tis to be ſlacken'd or unbridled by ſeveral Cuts of the Inciſion Knife; after which we are to apply two ſmall ſtrait wooden Splinters, the one above, and the other below the Finger, to bind it with a Band, and every Day to tighten 'em more and more, till the Part has reaſſum'd its natural Figure.

The *Panaris*, or *Paronychia*, is a Tumour which grows at the Extremities of the Fingers, and is commonly call'd a Felon or Whitlow. 'Tis caused by a fiery, sharp and corrosive Humour, which eating into the *Periosteum*, the Extremities of the nervous Flesh and Fibres scarifies. 'Tis known by its great Tension, strong Pulsation, sharp Pain, burning Heat, and scorching Fever, which always accompany these Sorts of Tumours. Our Predecessors distinguish'd two Sorts of *Panaris*, one whose Matter was contain'd betwixt the Skin and the *Periosteum*, and the other whose Humour is fix'd betwixt the *Periosteum* and the Bone: But this last Species is purely imaginary, it being wholly impossible for the Quantity of Matter which we see coming out of it, to be contain'd within the Space of less than the sixth Part of an Inch. But 'tis always betwixt the Skin and the *Periosteum*, and the whole End of the Finger is soak'd in it; and if we frequently find the Bone uncover'd, 'tis because not only the *Periosteum* is corroded by the acrimonious Matter, but also the Ligaments which fasten'd the Bone of the third *Phalanx* to the second, which occasions the falling of the last Bone by the Suppuration.

Of all Impostumes the *Panaris* is the most painful, because the Extremity of the Fingers not being able to stretch sufficiently to contain the Matter gather'd there, that occasions an excessive Tension, which causes an insupportable Pain, which being augmented by the Corrosion of the Matter, and working on the Extremities of the Nerves which end there, causes it self to be felt with such Violence, that it does not allow a Moment's Repose, and indeed we cannot hinder the Patient complaining, considering the great Torment which we see him labour under.

These Tumours are with the utmost Haste to be brought to Suppuration by the strongest maturating Remedies, such as Sorrel, Lilly Roots, Leaven, Pidgeon's Dung, and *Basilicon*, of which we are to make little Cataplasms, which are to be frequently renew'd, because the violent Heat of the Tumour soon dries them. Sometimes it gangrenes, by reason that the arterial Blood is hinder'd from coming thither by the too hard Tension of the Part; wherefore we are to open it [a] first, without staying for its Fluctuation as well to avoid its Mortification, as to procure the Patient that Ease which he impatiently expects.

In order to this, we make Use of a Lancet which is somewhat larger than those us[ed] in Bleeding, with which we make an Incision lengthways on the Side of the Finger that we may not run the Risque of prickin[g] the Tendon, which may happen if we ope[n] it in the Middle. Though after the Aperture there sometimes comes out nothing b[ut] serous Matter and Blood, the dischargi[ng] the Part of it gives the Patient Ease, decreasing the extream Tension, dislodges the Matter when digested, and causes the hard Cores to come out as fast as they loosen.

After the *Panaris* is open'd, we yet continue the Use of ripening Ingredients; and if we judge the Use of Cataplasms unnecessary, we lay on the Incision a Pledget cover[ed] with *Basilicon*, and over it a Plaister of *Di[a]chylon cum Gummis*, shap'd like a *Malt[e]* Cross, to perfect its ripening. We then l[ay] on a Bolster of the same Figure, and fast[en] the whole with a Band circularly roll'd [a]bout and slop'd at the Top of the Finger, whi[ch] we afterwards put into a Leather Fing[er]-stall made for that Purpose, and provi[ded] with two narrow Strings to tie on [the] Wrist. This done, the Hand is to be p[ut] into a furred Glove or Muff, that the H[eat] may advance the ripening of the Humo[ur], and the Arm is to be slung in a Scarf, w[ith] the Hand somewhat higher than the Elbo[w] lest it should hang down, and thereby [oc]casion a Flux of Humours on the Part [af]fected.

We are not to be surpriz'd if on the [fir]st Day after the Incision we find an Inflat[ion] of the Flesh occasion'd by that Operati[on]. 'Tis a Symptom which always happens; the Flesh being sob'd in the Humours, f[inds] it self too hard prest'd by the small Bul[k] the Finger, and therefore endeavours to m[ake] its Way out, which it never fails to [do] through the Orifice already made in [the] Skin. 'Tis of a livid Colour, and so[me]times dissolves by Suppuration: But [it] obstinately resists the Efforts of all R[e]dies, and continues to stop up and clo[se] Wound, 'tis to be cut off with the Sci[s]-

which is to be done all at once, and conſequently more expeditiouſly than it can be conſumed by a Cauſtick.

When the Matter has corroded the *Perioſteum*, the Bone in the laſt *Phalanx* muſt exfoliate or putrefy, and being but ſmall, it frequently comes out whole, which cannot happen, without the End of the Tendon, which is faſten'd to it, is ſeparated, and its being corrupted and putrefy'd by this virulent Humour; in which Caſe Nature ſeparates the corrupted from the ſound Part of the Tendon, with the Aſſiſtance of the balſamick and ſpirituous Remedies pour'd on the Wound. The Surgeon is then no longer to make Uſe of *Diachylon*, the *Unguentum ſanctum* being the very Remedy, by whoſe Aſſiſtance we obtain a perfect Cure of this cruel Indiſpoſition.

The Extirpation of a Finger is perform'd on Three Occaſions: The Firſt is, when by ſome Accident that Part is cruſh'd or bruis'd; the Second, when 'tis gangren'd; and the Third, when a new born Infant brings with it into the World ſeveral ſupernumerary Fingers. The Workmen that are employ'd in Building, are daily in Danger of bruiſing their Hands and Fingers by the Stones which may fall upon them, or their being pinch'd betwixt two Pieces of Wood. The Sportſman runs the Riſque of breaking them by the burſting of a Piece in firing, as I have frequently known to have happen'd. The firſt Intention of the Surgeon who is called in theſe Caſes, muſt be the Preſervation of the Hand and Fingers, and never to cut them off, unleſs when there is no Hopes left of preventing their Mortification; for if there yet remain ſome Artery to convey Life, and any Vein to keep up the Circulation of the Blood, Amputation is not to be preſs'd; for that will always fall in timely enough, when we find the natural Heat has wholly abandon'd the Part, and utterly ceas'd communicating it ſelf to it: But ſuppoſing a Finger to hang only by a little Bit of Skin, or one of the Tendons, it muſt be ſeparated from the Hand, by reaſon that its attracting the Tendon may draw on pernicious Accidents. In this Caſe this Separation is made by a ſingle Cut with a Pair of Sciſſars, immediately after which the Patient is to be dreſs'd with proper Remedies.

A Finger may gangrene by the abundant Affluence of Humours having ſuffocated the natural Heat as in the *Panaris*; or by its being ſtifled by ſevere Cold, as in a hard Froſt. In theſe Caſes the Surgeon is to endeavour to recal the natural Heat by Scarrifications, which are to be made on the Sides for fear of touching the Tendons, applying to the Part camphorated Spirit of Wine, and vigorous ſpirituous penetrating Remedies; but if he find the Senſe of Feeling wholly deſtroy'd by a *Gangrene*, or confirm'd *Spacele*, he is to proceed to Extirpation. Some ancient Writers direct us to lay the Fingers on a Wooden Block, and with a Chiſſel ſever it from the Hand. Others propoſe the *Inciſory Forceps*, by which it is to be wholly cut off at once: But both theſe Methods are at preſent diſliked, as ſavouring more of the Butcher than the Surgeon; and we are by much better Reaſons induced to extirpate the Finger, by cutting it off with the ſtrait Inciſion Kniſe at one of its three Joints. The *Apparatus* is not ſo diſmal, and the Operation is quickly over. We then apply to the Stump of the Finger, after having allow'd it to bleed ſufficiently, a Pledget cover'd with an Aſtringent, and over that a Plaiſter, and a Bolſter ſhap'd like a Croſs, all which are to be ſubject to, and faſten'd by a Band, which is to be fitted to the remaining Part of the Finger.

We often ſee Children born with more than five Fingers; but thoſe which are ſupernumerary are never ſo perfectly form'd as the other. They that are placed without the Hand, near the little Fingers, generally have no Bone, and ſometimes no Nails. They are like fleſhy Excreſcences which hang to the Hand. About ſix Months ſince I was ſent for to ſee a Child which had one of theſe on each Hand. I immediately cut off one of them with my Sciſſars, referring the other to another Time, which I afterwards alſo did when the firſt was cur'd, to avoid putting the Child to too much Pain at one Time. If any bony or cartilaginous *Phalanx* has ſtrongly fix'd theſe ſupernumerary Fingers to the Hand, we may then make Uſe of a ſmall Inciſion *Forceps*, with which we are to cut them clear off at once as near the Hand as poſſible, and then dreſs them as

ſimple Wounds, always more eſpecially taking Care that we leave no Deformity.

Of the Application of the Seton. *From Fig. 53. of the ſame Author.*

THE *Seton* is a Chirurgical Operation which makes two Holes in the Skin by Means of a great threaded Needle. This Name of *Seton* is deriv'd from the Word *Seta*, a *Hog's Briſtle*, by reaſon the firſt Surgeons made Uſe of them to run through both the Orifices made with the Needle. Thoſe who ſucceeded the Inventors of this Operation, pretended to have ſucceeded better with Horſe-Hair, becauſe longer and more commodious; and their Succeſſors have wholly laid aſide the Uſe of any Hair, alledging, that it was too hard in the Wound, and did not ſufficiently facilitate the Filtration of the Humours, which is the End propos'd; wherefore they ſubſtituted a Cotton Wick, as ſofter, and more proper for the Execution of that Deſign. And laſtly, other Surgeons have condemn'd that, urging, that it has ſmall Points, which inceſſantly pricking the Wound, fatigue and incommode it, and will have us make Uſe of Flaxen Thread undreſs'd, which has never paſs'd through the Lye.

The *Seton* may be apply'd in all Parts of the Body, but that where our Predeceſſors apply'd them, was the Nape of the Neck, from which Operation they expected conſiderable Effects. They believ'd it excellent in *Epilepſies*, *Hydrocephali*, all Sorts of Fluxions of Humours on all the Parts of the Face; and *Fabricius Hildanus* tells us, that he has done Cures with it that might paſs for Miracles. The Ancients made Uſe of a red hot Iron to pierce the Skin, which they thus managed: They cauſed the Patient to ſit on a Stool without a Back, and lean his Head a little backwards, that they might pinch up the Skin of the Neck, which he fix'd betwixt two Plates of the *Forceps A.* made in Form of a Water-Mold or Iron, and pierc'd through in order to admit the Needle; and thus with the Left Hand holding the Skin cloſe in theſe Pincers, in their Right they took the Actual Cautery *B.* red hot, and thruſt it through the Holes of the Pincers, by which Means they made two Holes i the Skin. The Actual Cautery having mad theſe Holes big enough, they drew it ou and giving it to a Servant, in the ſame Han took the great Needle *C.* ſhap'd like th us'd by Shoemakers, and threaded with th Wick *D.* run it through the Holes befo they open'd the *Forceps*. The Wick thus ru through, they took away the Pincers an the Needle, leaving the Wick in the Wound into which they ſoak'd a Medicament com poſ'd of Oil and the Yolk of an Egg, t help the Separation of the Scars. They the laid on theſe Orifices one of the Pledget *E. E.* dip'd in the ſame Remedy, then th Plaiſter *F.* the Bolſter *G.* and the Band *H* with which they form'd the circular Bandage about the Head. They daily drew ou a little of the Wick, in order to convey th Medicament afreſh into the Wounds. After the Fall of the Scars, they continued the changing of the Place of the Cotton Wick, and when it was all us'd up, they faſten'd another to its End to renew it; and this they continued as long as they judg'd the Diſtillation of Humours neceſſary for the Cure of the Diſeaſes which had occaſion'd their Application.

'Twas a Controverſy betwixt the Favourers of this Operation, whether the Skin was to be pinch'd longways or acroſs; that is, whether the two Holes were to be from one Side to the other, or one above the other, which is of ſo little Conſequence, that it does not deſerve our ſtopping at it, and the rather, becauſe this Operation is not practis'd at preſent. When there is a Neceſſity to provide an Iſſue for thoſe Humours which occaſion all the Diſeaſes of the Head, we lay on a Cauſtick Stone on the *Foſſula* of the Neck, and by that Means give the Iſſue, and they filtrate inceſſantly, which cures theſe Diſeaſes as well as a *Seton*. The *Italians* have been great Lovers of this Operation, but they ſeem at preſent to be much come off from that Opinion; for being in *Italy*, I met with ſeveral who laid Cauſticks to the Arm. The *Seton* is not only cruel in its Application, but very troubleſome in its Conſequences. The Cauſtick does not require ſo many Preparatives, it gives leſs Pain in laying on, we dreſs it more commodiouſly, and receive the ſame Advantages from

om it; 'tis not then without Reaſon, that e *Italians* and the *French* have ſubſtituted in the Place of the *Seton*.

To conclude, if any one is ſo prepoſſeſs'd favour of a *Seton*, that he will prefer it the Cauſtick, and will have it apply'd, dviſe the Surgeon then not to make uſe either of the Pincers, or the Red-hot on, but only of the large Cutting-Needle threaded with the Lace *K*. and run it ro' the Skin of the Nape of the Neck, nching it only with the Fingers of his eft Hand: Thus this Operation is done in Moment, there are no Scars to fall, and e ſame Advantages reſult from it. We derſtand alſo by this Word *Seton*, a very ttle narrow Linnen Band, which by the elp of a Needle, we run thro' Wounds hich have an Entrance and Exit: I have ſt now hinted to you, that they are to be n through the Wounds, out of which we ve extracted Balls, or other exotick Bo-es, through the oppoſite Part. We take en the *Seton-Needle L.* blunt at the End, at it may not hurt, and threaded with the rrow Band or Tape *M.* which we run ro' the Wound from Part to Part, im-b'd with ſuch Remedies as we think pro-er. There is alſo another and longer eedle, compos'd of two Pieces *N, N.* to nder it more Portable; they are to be in'd together by a ſmall Screw: This is 'd in Wounds which run thro' the highs; the *Seton* placed, we take out the eedle, and continue the Dreſſing as above rected.

f the Opening of the Abſceſs. From Fig. 54. *of the ſame Author.*

THE Aperture of an Abſceſs, is call'd *Onchotomie*, which is deriv'd from the reek, and ſignifies to cut a Maſs or gather-g of Matter; ſo that this Operation con-ſts in the making an Inciſion in the Place here Matter is gather'd. I ſhall not enter to the particular Cauſes of unnatural Tu-ours in this Place, but confine my ſelf to e Operation, which is to be perform'd hen the Cure cannot be effected by Way Suppuration.

When the Surgeon undertakes the Cure of a Tumour which is to end in a Suppuration, he muſt examine very well the Signs which expreſs the Condition in which it is, ſome ſhew that Matter is forming, and others, that 'tis formed. Thoſe which ſhew that 'tis forming or gathering, are a Tumour, Pain, and a Redneſs of the Part, the Patient feels a Shooting in the Tumour, his Reſt is broken, and he has a Fever. *Hippocrates* tells us, that whenever Matter gathers, Pains and a Fever ſupervene: If the Surgeon on feeling the Tumour finds there is no Fluctuations, 'tis a Sign that the Matter is not yet digeſted; in which Caſe it muſt be helped on, by ripening and putrefying Medicaments: If the Tumour is ſmall, the Surgeon contents himſelf with laying on a Plaiſter of *Diachylon cum Gummis*, with a little *Baſilicon*; but if great, hard, and far from Coction, he is to make Uſe of ſtronger Remedies, Sorrel, Roots of Sillies and Marſh-Mallows, Leaven and Pidgeons Dung, all of them boil'd in Pork Fat.

The Signs which ſhew that Matter is form'd, are the Decreaſing of the Tenſion, Redneſs and Pain; the Tumour riſes a little to a Point, and ſeems to mark out the Place, where the Matter puſhes to come out; by putting out Two fore Fingers on it, and reſting them there alternatively, we feel the Matter float in the Tumour, which is an undoubted Sign that it is ripe, and that it ought to be immediately open'd. Able Practitioners propoſe to us two Ways of opening the Abſceſs, either with Cauſtick-ſtones, or the Lancet; both of which are equally good, but in ſome Tumours the Firſt is neceſſary, and in others the Lancet is preferable: Which I ſhall ſhew you in few Words.

When the Tumour is compos'd of cold Humours, and has ripen'd but ſlowly, we are to defer the Opening as long as we can; we run no Riſque by ſtaying, for the Matter being form'd from cold and gentle Humours, cannot Occaſion thoſe Scars, nor the ſame Inconveniencies, which would attend that of a hot Humour. Beſides, ſhou'd we open theſe Sorts of Tumours as ſoon as we feel the Fluctuation in the Middle, there wou'd remain a Hardneſs, which we ſhou'd find difficult to mollify afterwards; wherefore the Operation is to be retarded till the

Whole

Whole is in a proper Condition to be evacuated; becauſe the Matter produces Matter, and that already digeſted, helps to digeſt the reſt: Which done, the Surgeon is to lay over the whole Length of the Tumour, a whole Train of Cauſticks, for Two Reaſons; the Firſt, becauſe the Heat of theſe Cauteries compleats the Coction of the Humour; and the Second, becauſe the Scars being fallen off, leave an Orifice large enough to convey in the Remedies proper to diſſolve and conſume the Hardneſs, which could not be ſoftned by Suppuration. When Abſceſſes are deep, we muſt alſo make Uſe of Cauſtick-ſtones, becauſe they make a larger Orifice than the Lancet, and therefore facilitate the Conveyance of Remedies to all the Parts of the Cavity of the Abſceſs.

But when the Tumour ripens quick, and by its Softneſs we diſcern the Matter to be perfectly digeſted, we are not to ſtay for its eating thro' the Skin, in order to iſſue out of it ſelf, for by its Continuance within, it may Occaſion ſome ill Effects, by Corroding the Fibres of the Fleſh, which are more tender than thoſe of the Skin; we are then without delay to make Uſe of the Lancet, making an Orifice large enough to evacuate all the *Pus* contain'd in the Tumour: Some Authors have invented a Ring, in which they fix a ſmall Inciſion-Knife, which they make Uſe of to open Abſceſſes in timorous Children, and ſuch Perſons as cannot be prevail'd on to endure what they think proper to do to them: They put this Ring on one of their Fingers, and on pretence of feeling the Tumour, pierce it with the Inciſion-Knife, and ſo dextrouſly deceive their Patients. But this Procedure ſeems to me to favour a little of the Mountebank; wherefore I can't adviſe you ever to make uſe of it. If this Operation is to be perform'd on a Child, it need only be held faſt; and if any grown Perſon prove rank Coward enough not to ſuffer it, the Surgeon is to quit and abandon him to his Fate, without being at the Trouble of ſearching after Stratagems to ſurpriſe him.

If we have reſolv'd to make uſe of the Cautery, we take the Plaiſter *A.* which is ſlit the Length of the intended Orifice; this we lay on the Middle of the Tumour, then lay Two or Three of the Cauſtones *B, B, B.* in the Slit of the Plaiſter, and over them the ſmall long Bolſter, with a Band faſten on the Dreſſing. let theſe Cauſticks work for two or Hours, but if we wou'd have them eat we leave them on longer. After havin ken off the Whole with a Lancet, we an Inciſion on the Middle of the Scar, enough to reach the Matter, which we fer to run out as much as it will, and in the Tumour, for the World is diſab with Regard to the Miſtake of the Anci who fear'd the Weakening their Patien evacuating an Abſceſs all at once. W as we find on the Contrary, that the we force the Matter out, the more they eas'd, eſpecially when the *Pus* is perf form'd. Experience in *Hydropicks* alſo ſtroys their Notion, they would not us draw off the Water at leſs than fou five Times, alledging that we ought n proceed from an extream Repletion, extream Inalition: And at preſent, empty them to the laſt Drop, without diſcovering any Sign of Weakneſs; an ſee them come to the Surgeon to have Puncture made, and afterwards re Home with the ſame Vigour with w they came thither, ſuppoſing they b were ſtrong enough to come of themſel for in moſt Dropſies, the Patients freque wait the laſt Extremity, before they re to undergo the Operation.

If we fix on opening the Tumour wi Lancet, we are to take that mark'd which is longer and broader than thoſe in Bleeding, whence 'tis call'd the Ab Lancet. Having open'd and half folde we take it in our Mouth, examine the where the Matter is, and having obſe it, with the Thumb and fore Finger o left Hand, we extend the Skin, that it ma vacillate in the Time of the Operation, with the Right take the Lancet and ſtri in as far as the Matter; then raiſing i in the Elevation we ſufficiently enlarge Orifice, to give Iſſue to the *Pus*, which ſee immediately iſſue out, and whic receive in a Porringer or ſome other V prepar'd ready for that End; we preſs Tumour a little on each Side, in ord diſch

charge it. Having judg'd by the Quan- of Matter come out, that there muſt re- in a great Vacuity, with the hollow obe *E.* which we introduce into the ound, we endeavour to diſcover on what e the Vacuity is largeſt, and with the ooked Sciſſars *F.* we open the empty Side, particularly when it happened to be dermoſt; ſo that this hollow Probe ſerves o Ends, one to inform us of the Size and ture of the Cavity, and the other to ide the Points of the Sciſſars which are to ate it. Some Surgeons which do not over ch affect Neatneſs, after the firſt Aper- e with the Lancet, convey their Finger to the Abſceſs to explore its Breadth and pth; and if it be found Neceſſary by any ciſion to enlarge the Orifice, their Fin- performing the Office of the Probe ves as a Guide to the Points of the ſſars.

Theſe Sorts of Apertures require three rcumſtances, which are very Eſſential: e Firſt is, that they be made according to Rectitude of the Fibres of the Muſcles ng by, and not acroſs them, for fear of ming the Patient; the Second is, to make em always on the declining or undermoſt rt, that if there remain any Purſes of atter, they may iſſue out of themſelves; d Thirdly, to make them large enough the firſt Day, as well to avoid the being ced to make freſh Inciſions afterwards, for the more eaſy Conveyance of the Re- edies to all the Parts of the Cavity of the bſceſs. The Orifices being as I have hint- , and the Matter evacuated, we dreſs the tient: We make uſe of nothing elſe at e firſt Dreſſing but Lint, the better to im- be the Remainder of the *Pus*; of this we ake two Stopples in Bulk proportioned to e Size of the Cavity: That which we ruſt to the Bottom mark'd *H.* is to be ovided with a Thread, that when we reſs the Patient again we may be ſecure, at after having taken that out, there re- ains no more in the Wound: Having af- r that apply'd the Two other *I, I.* we co- r them with the flat Pledget *K.* and the laiſter *L.* cover'd with *Diachylon*, in order diſſolve the Remainder of the harden'd umour, and above that the Bolſter *M.* and laſtly, the Band *N.* roll'd circularly ſeveral Times to keep on the *Apparatus.*

On the next Day we cover the Stopples with *Mundificative Ointments*, as that of *Apoſtolorum*, with which we mix a little *Ægyptiacum*; if there be any putrid Fleſh which we wou'd conſume, we labour to deterge and cleanſe the whole Bottom of the Abſceſs, which we then leave to fill up with Fleſh: Being ſufficiently incarnated, we make uſe of Deſiccatives, in order to bring it duly to cicatrize, which is the End propos'd from the Beginning.

The Abſceſſes which come on the Face, prove not a little Troubleſome to the Surgeon, becauſe he finds himſelf under a Neceſſity of making Inciſions there, to give Vent to the Matter, which leaving Scars occaſions the Disfiguring of the Part. The Surgeons labour'd under this Perplexity in the Caſe of the Duke of *Berry*, who on the 3d of *October* 1706. return'd from hunting with his right Cheek very much ſwollen; they bled him and laid on Cataplaſms, to try to diſſolve the Humour which occaſion'd this Tumefaction. They bled him a ſecond Time, but the Tumour which proceeded from almoſt an Infinity of Contuſions, occaſion'd by the reſting of the Fuſil againſt that Part, reſiſted all Remedies; they found it proceeding towards Suppuration, by its Redneſs, the Augmentation of the Pain, the ſmall ſhare of Reſt which it allow'd him, and the Inflation of the Eye, Noſe and Lips: And indeed, the Duke, for three Months before this, had been ſo often out a Hunting, each of which Times he had received four or five hundred Blows with the Fuſil, and had brought back with him Two hundred and fifty Pieces of Wild-game, that his Cheek was ſo mortified, that there was little Hopes left of its Reſolving. On *Tueſday* the 12th of *March*, Mr. *Mareſchal* felt a Fluctuation in the Tumour, and having made me feel it, the Neceſſity of opening it, and the Place where the Orifice was to be made, was agreed on, the Hour pitch'd on was at Two in the Afternoon, when the Duke being placed in an Elbow-Chair, that being the moſt convenient Poſture, whilſt I held his Head, Mr. *Mareſchal*, in the Preſence and with

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the Advice of Monſieur *Fagon*, ſtruck the Lancet into the loweſt Part of the Tumour, and raiſing that Inſtrument, open'd it at a Pins length, the *Pus* immediately iſſued out, in Quantity enough to have fill'd a large Egg-ſhell, Mr. *Mareſchal* thruſt one of his Fingers into the Wound, and felt round the Cavity of the Tumour, to diſcover whether the Bones were uncover'd, and having found the *Perioſteum* fix'd on the Bones of the *Pommetre* and upper Jaw, he dreſs'd it. The Dreſſing was afterwards continued on with the Injection of Deterſives, which cleans'd the Bottom of the Abſceſs, which fill'd up with ſound Fleſh in a very little Time; for in Twenty Days that Prince was perfectly cured, and the Orifice being made as ſmall as poſſible, and as near the Ear as the Tumour would permit, there remain'd but a little long Scar, which will be hid by the Peruke.

The *Carbuncle* vulgarly call'd the *Coal*, is ſo term'd by reaſon the Patient feels a burning Pain, and that the Effects which follow it, are like thoſe which we feel when we have laid a burning Coal on any Part. Moſt Authors confound the *Carbuncle* with the *Anthrax*, alledging, that both of them reſult from an atrocious and boiling Blood, and that they differ only in Degree and Circumſtance: And that according to the Verſion of the *Greek* Word *Anthrax*, it ſignifies a *Carbuncle* or *Coal*: But yet by the Deſcription I am going to make, you will find that they are to be referr'd to Two different Kinds of Tumours, which require different Remedies, in order to their Cure.

The *Carbuncle* is defin'd to be an aſhy black *Puſtule*, attended with Redneſs and Pain, Heat and Inflammation about it, which raiſes it to a Bladder or Bliſter that burns the Place where it is, and which when it burſts leaves a Scar of the ſame Sort with thoſe which remain after Cauteriſing and Burns. There are two Sorts of them, the one Simple and Benign, cauſed by the acrimonious Seroſity of an atrabilious and boiling Blood, which makes an Impreſſion on the Skin through which it paſſes, and which gathering under the *Epidermis*, there produces a great Puſtule, like that occaſion'd by Burns: The other is malignant and peſtilential, and reſults from a burning Seroſity like *Aqua-fortis*, which forms deeper Scar than the former; it happens peſtilential Times, and is always mortal. ſhall not treat of general Remedies he but leave them to the Diſcourſe of T mours in General, and proceed to thoſe C *buncles* which are curable.

If the *Puſtule* of the *Carbuncle* is not op it muſt be immediately open'd, that the rous Matter may have Time by a long C tinuance to make a ſtronger Impreſſion the Skin, we are then with a Lancet make Scarifications to the Quick, on all t *Carbuncle* that is livid and black: Whi the Blood and ſerous Humours iſſue ou we are to diſſolve a little *Treacle* in Spirit Wine, and in that Diſſolution ſoak Pledget, with which we are to cover t Scarifications which we have been makin and this Dreſſing is to be renew'd from S to Six Hours, without Bleeding the Patie If he is replete and robuſt, we are to repe the Bleeding ſeveral Times, obliging him take Cordials, and obſerve a ſtrict Di The next Day, if the Patient does not fe any Pain in the Part, and we find t Blackneſs increaſe, we are to redouble o Scarifications, and make them ſo deep, th he may prove very ſenſible of them, an apply the *Aqua Phagedenica*, compos'd Lime-water and Sublimate; this is a pote Remedy againſt Mortification. Monſie *de Lulli*, that great Phyſician, died of a li Puſtule on one of his Toes. But if on t Circumference of the black Part we diſcer a little Circle, 'tis a Sign that the natur Heat remains in the Part, and that the Sc will ſeparate, we are then to procure the S paration by unctious Medicines, but ſuc as are always animated and quicken'd f fear of too great Suppuration. The Sc being fallen off, we are to incarna and cicatrize it; but above all, after t Cure, we are to purge the Patient ve well, to carry off this burning Seroſit and by that Means prevent a Relapſe.

The *Anthrax* or *Antrakion*, is a Tumo in the Fleſh caus'd by a burning Humou which ſwells and drives it out as though were a *Granado* or *Bomb* ready to burſt. Th Word *Anthrax* is derived from Two oth *Greek* ones, *Anea* ſignifying *High*, and *Th rein* to Spring, intimating, that the Tumo produc

produced by it being full of inflamed Liquors, forms a Scorching, rising like a Mountain, which is ready to vomit Fire, Flames, and the Matter which it contains. The Tumours which proceed from Abscesses, generally make but one Hole, through which they give themselves Vent, when Time is allow'd them; but that which produces the *Anthrax* is so corrosive, that it eats several Holes, I have seen some have Seven or Eight. It is so hot that it burns all the Flesh which it soaks into; wherefore we are not to be surpris'd if the Patients never sleep, if they grow impatient, and are continually crying out; for of all Tumours, this is the most painful.

This Indisposition may happen to any of the Parts of the Body: When it fixes near the tendinous or membranous Parts, 'tis more painful than in the Musculous; and if it falls on the Neck, it causes it self to be more felt than any where else, which I have seen verified in three Persons belonging to the Court, which I dress'd and cured; one of them was Monsieur *de Chamarante*, principal Steward to the Dauphiness; the Second, the Chevalier *Dudicour*; and the last, Monsieur *Duchene*, principal Ordinary of the King's Cup. These three *Anthraces* were at the hind Part of the Neck, near the Basis of the *Cranium*, where it not being possible for them to extend far, they caus'd an insupportable Tension.

The first Days the Tumour being hard, red, and driven outwards, I laid on Maturatives, but the Matter not staying for their Operation, burst out through several Holes which it made in the Skin: All these Holes I cut into one, and continued by cross Incisions, to uncover all this burnt Flesh, and make Way for it to come out in great Clusters, as it did daily, and continued to do, till it loosen'd and fell off by Bits: As soon as these Incisions were made, the Pain was not so great, and it diminished in Proportion to the Separation: The Scars being fallen off, there remained a Cavity big enough to hold an Egg, which I allow'd to fill up with Flesh, and finish'd the Cure as in other Abscesses. We have a memorable Instance of this Indisposition in the Person of the King, who had an *Anthrax* at the same Place, in the Year 1697; and as in Persons of that high Rank, Surgeons endeavour to be sparing of Incisions in this Case: It was deferr'd as long as possible, but the Clusters which loosen'd themselves from the Bottom, could not get out at the little Holes, which the most subtil Part of the Matter had made; wherefore the Surgeons were oblig'd to make Incisions, which succeeded very well. I relate these Facts only to shew that an *Anthrax* cannot be cured without Incision.

Of Enkystated or Tunicated Tumours. From Fig. 55. *of the same Author.*

THE enkystated Tumours are those whose Matter is enclos'd in a small Bladder or Membrane, which we call by the *Greek* Name of *Kystis* or *Cystis*, which signifies a Bladder; which being derived from *Kyin* a *Greek* Verb that imports to *hide*, intimating, That this little Bladder hides from us the Matter which it contains. These Tumours are known to us by the Name of *Wolves*, of which there are three Sorts, most of which have had Names given them from *Greek* Words, which signify the Thing to which their subject Matter refers. When they happen to the tendinous Parts, as the Hand, the Wrist and the Feet, we call them *Ganglions*, and when they are fill'd with a Matter of the Nature of a Pulse or Pap, they are term'd *Atheromæ*: When they contain a Tumour resembling Honey, we give them the Name of *Meliceris*: When their Matter is more solid, and has the Consistence of Tallow, they are call'd *Steatomæ*; and when they are hard and assume the Shape of a Gland, they are look'd on as harden'd Glands.

Some Authors affirm, That the *Kystis* which encloses these various Matters, is form'd by the Dilatation of some Lymphatick Vessel, where the *Lympha* coagulating, turns to various sorts of Matter, according to its different Mixture with other Liquors: But there is more probability, that the Principle of these Tumours is a small Gland, because the Action of the Glands being incessantly to filtrate some Humours, if there

happen to be any Obſtruction in the excretory Veſſel, the Humour is then oblig'd to remain in the Gland; and by the Swelling of it, force the Membrane to extend and form the *Kyſtis*, of which we have been ſpeaking. Experience confirms this Opinion, for if we make an Inciſion on one of theſe Tumours, and after having voided the Matter, we don't conſume the Membrane which contain'd it, there filters into it a freſh Humour, which in Time produces a new Wolf.

Theſe Five mention'd Sorts of Tumours are not at all painful, by reaſon that the Matter which compoſes them, is of a gentle and benign Nature; and being neither hot nor purgent, does not occaſion any Inflammation or Itching; which are the Reaſons why they may be ſupported during a whole Life, without the Patient's being incommoded by them, if they do not grow exceſſive big, or are not ſituated in ſome Place, where they obſtruct ſome natural Motion. Yet moſt of thoſe People who have them, are uneaſy and impatient to ſee themſelves under this light Deformity, from which they will at any Rate be delivered, and therefore apply themſelves to the Surgeon.

Surgery preſents us with four Ways of curing theſe Tumours, the Firſt is by *Reſolution*, and diſſipating them; the Second, by *Suppuration* and opening them; the Third, by *Ligature*, when their *Baſis* is narrow; and the Fourth, by *Extirpation*. Reſolution is the moſt gentle and beſt Way of diſſipating theſe Tumours, when the Humour will yield to Medicine; wherefore, before we proceed to any others, that is firſt to be try'd. We apply emollient and reſolvent Cataplaſms and Fomentations, prepar'd with Marſh-Mallows, Wormwood, Mugwort, Sage and Juniper-Berries: If the Tumour is very hard, we make Liniments with the Oils of Lillies, Camomil, Earthworms or Elder: We lay on Hemlock, Laudanum, Soap, Frogs with Mercury, *&c.* Some will have us preſs them with our Fingers, or beat them frequently with a little Palate, in order to break the *Kyſtis*, as alſo that we lay on them a ſmall leaden Plate rubb'd with Mercury, and with a Bandage bind them as hard as we can.

In propoſing Suppuration as a Way t cure theſe Wolves, 'tis not to be expecte that we are to underſtand ſuch a one a Tumours form'd from hot Humours ar brought to, they converting themſelves int a proper well digeſted *Pus*: We mean only that after having with the Lancet *A.* open the *Wolf*, and evacuated the Humour, w cauſe the *Kyſtis* to fall out by Suppuration without which, the Cure wou'd be imper fect; we cover the Pledget *B.* with Reme dies proper to conſume it, and if the Orifice prove too ſmall, we enlarge it with the Inciſion-Knife *C.* or the Sciſſars *D.* chuſing which of theſe Two is moſt commodious.

There was at *Paris* one Monſieur *Gervaſ* who was in Reputation for curing all Sorts of Wolves with a Cauſtick Remedy, which he laid on the Tumour: He open'd the Skin, if the Contain'd was fluid, and the *Kyſtis* was open'd by the Remedy, he evacuated the Humour, and ſo conſum'd the Membrane as all others do; if it was a *Ganglion* or harden'd Gland, with his Remedy he extirpated it by ſlow Degrees, and made it fall like an empty Nut-ſhell. In ſhort, applying himſelf only to theſe Diſeaſes, he cured a greater Number than the other Surgeons, and conſequently had more Experience in them. When a *Wolf* has a narrow *Baſis*, and hangs like a Pearl to the Ear, the Ligature is a ſure Way of making it fall off. Some Authors will have us to this End make uſe of a Horſe-hair, alledging that it cuts it in a ſhort Time; but we tye it cloſer with the Flax Thread *E.* with which we bind the Skin of the *Baſis* of the Tumour, which we thus force to fall off by Mortification: 'Twould be ſooner done to take it clear off at one Cut with the Pen-Knife *F.* as I have done to ſeveral Perſons who have had it on their Head, and other Parts of the Body; the Patient is rid of it at the Expence of a moments Pain, whilſt the Ligature is ſeveral Days doing the ſame Work; but Women and tender People always prefer the Inciſion.

The fourth Way is Extirpation, which is to be practiſed when emollient and reſolvent Medicines prove inſufficient, eſpecially when the Baſis of the Tumour is large, and

it is ſunk into or fixed in the Fleſh. This Operation conſiſts only in the making an Inciſion longways, if the Tumour is long and narrow; or croſsways, if big and round: We make uſe of a Pen-knife *F.* to make theſe Inciſions on the Skin which covers the Tumour, and with the two Inſtruments *G, G.* we ſeparate the Lips of the Wound, in order to graſp the Tumour betwixt the Forceps *H.* that we may ſeparate and diſſect it with the Myrtle-Leaf *I.* which has a Tooth-pick at one End to make uſe of, if occaſion offer. If the Fibres, which faſten and fix the Tumour, happen to be ſo hard that the Tooth-pick or Myrtle-leaf cannot cut them, we make uſe of the Pen-knife *K.* for that End, taking Care that we do not open the *Kyſtis*, the Surgeons addreſs, conſiſting in the carrying off all the Tumour and Matter contain'd in this Purſe: The Niceneſs of the Operation, and the Pain which it gives, have alarm'd ſeveral Patients, and engag'd them to throw themſelves into the Hands of Mr. *Gervaſi*, or ſome other who has had great Experience in theſe Indiſpoſitions. The *Wolf* being taken out, we lay on the Wound the Pledget *L.* which we cover with the Plaiſter *M.* over which we lay the Bolſter *N.* and with the Band *O.* faſten the whole Dreſſing. If we find any Occaſion for Cauſtick-Powders, we find them in the Box *P.* and incorporate them with ſome Ointment, to conſume the *Kyſtis*; and all being over, we draw the Lips of the Wound as cloſe as we can, that the Scar may the leſs disfigure the Part. Of theſe four Ways, the laſt is the moſt ſure and expeditious, and that which is practiſed by Surgeons whenever their Patients will conſent to it: I have ſucceſsfully cured ſeveral this Way in leſs Time, and they have not endured ſo much as by the Cauſtick. A Youth belonging to Monſieur *de Chateauneuf*, had one of theſe Wolves, which occaſion'd a Tumour on the Cheek; I ſeparated it with the Point of a Pen-knife in the Inſide of the Mouth, and drew it out entire: It was as big as a Wall-nut; the Dreſſing was very eaſy, for with warm Wine, in which was a little Honey of Roſes, he rinc'd his Mouth ſeveral Times, and it heal'd.

Of Cauteries, Iſſues or Fontanels. From Fig. 56. *of the ſame Author.*

THE Cautery is taken in two Senſes, either properly for every Cauſtick which is ſtrong enough to make a Hole in the Skin, whether Inſtrument or burning Material, or improperly for the Hole when 'tis made, either actually or potentially; ſo that we give the Name of Cautery, as well to that which burns the Skin, as to the Burn, which is then defin'd to be a ſmall Ulcer of the Skin made by burning Materials, by the Induſtry of the Surgeon, in order to its propos'd Ends. I don't here pretend to particularize the Diſeaſes which require an Iſſue, in order to their Cure, but ſhall content my ſelf with ſhewing how this Operation is to be perform'd.

Cauteries from all Antiquity have been divided into two Species, *viz.* the *Actual* and *Potential*; the Firſt are hot and burning Irons, which cauterize at the Inſtant they touch: The other are Compoſitions of burning Medicaments, of which are made little Stones, which laid on ſome Place, produce a Scar there; and being fallen off, leave a ſmall deep Ulcer, thro' which the Humours run out as long as we keep it open. The firſt, Surgeons have left us an infinite Variety of theſe actual *Cauteries*; but tho' they have left us a great many, they have yet alſo left us the Liberty of inventing new Ones on proper Occaſions. I ſhall content my ſelf with here repreſenting to you Six, which will ſuffice to give you an Idea of the Practice of the Ancients.

Firſt, *A.* is the *Anſel*, ſo call'd from its Point being like that of a Sword.

The Second, *B.* is the *Olive Cautery*, ſo term'd from its being ſhap'd like a ſmall Olive.

The Third, *C.* is the *Button-Cautery*, becauſe made like a Button, with a ſmall Point in the Middle.

The Fourth, *D.* is the *Cultellary Cautery*, that is a Sort of Knife which cuts only on one Side.

The Fifth, *E.* is the *round Plate Cautery*, which is us'd to correct or prevent Putrefaction after a Member is cut off.

The Sixth, *F.* is the *great Plate Cautery*, of an Octogonal Figure which is apply'd red-hot to the Place, from which we have cut off a Cancer, in order to dry up the corrosive Humidities, and at the same Time stop the Blood of the open Vessels.

You may by these judge of all the rest, which differ only in Figure, and are not less cruel; I know no Surgeon which at present uses them; and tho' I have caus'd them to be engraven here, 'tis rather to exile Horror in you with Regard to their Cruelty, than advise you to use them. *Potential Cauteries* are more in use, and we draw great Advantages from them in inveterate Distempers, after having in vain made use of other Remedies, as in Rheumatisms, Gouts, Defluxions on the Eyes, and in all those which we commonly call Catarrhous.

We make use of Cauteries to several Parts of the Bodies, but those to which they are most commonly apply'd, are the hind Part of the Neck, betwixt its first and second *Vertebræ*. Secondly, The upper Part of the Arm, in a little Cavity which forms it self betwixt the Muscle *Deltoides* and the *Biceps*: Thirdly, the inner Part of the Knee, a little below the *Ligula* of the Flexures of the Leg. Before we apply the Cautery, we are to be provided with Caustick-stones, of whose Virtue and Efficacy we are assured, for when we buy them, we cannot answer for their Success, they may eat too deep or too shallow, which may oblige us to lay on others. But they prove yet worse, when they are too moist, and have not been kept in a dry Place: Wherefore, that the Surgeon may not be deceived, he ought to make them himself, and keep them against an Occasion, their Composition which follows being very easy.

Into a Pail of Water we are to throw a Peck of Oak-Ashes, two Pound of Pot-Ashes, one Pound of Quick-Lime, and half a Pound of Salt, leave them to steep three or four Days, stirring them daily with a Stick; all the Ingredients being well settled, we are to strain them so well, that nothing may pass but very clear Water, which we pour into the Kettle over the Fire, making it boil, till the Water turns to a Black-stone, and having taken it out of the Kettle, we break it into small Pieces or Stones, which we put into Glass Vials, and stopping them very well, keep them in a warm and dry Place.

There are some Circumstances to be observ'd, in order to the due Application of the *Cautery*, we begin with Cutting the little round Plaister *G.* of the Size of a Crown Piece, and provided with a Hole in the Middle, we cover it with a very Emplaistick Ointment, that it may stick fast to the Skin, and hinder the Scar becoming larger than the Hole in the Middle of the mention'd Plaister, which is to be proportion'd to the Dimensions of the Cautery which we design to lay on. We lay this Plaister on the Place destin'd to the Cautery, taking Care that it be well plac'd.

As soon as the Plaister is laid on its Place, we open the Bottle of Caustick, in order to take out the Stone *H.* which we both draw out, and lay on with the Pincers *I.* Before we lay it on, we wet the Skin with a Drop of Water to facilitate the Dissolution of the Stone, that it may the sooner take Effect. Over it we lay the little Bolster *K.* shap'd Square and wetted for the same End, this we cover with the large Plaister *L.* and afterwards with the Bolster *M.* and over that fix a circular Bandage with the Band *N.* which we draw somewhat tight, that it may rest on the *Caustick-Stone*, and hinder the *Apparatus* from shifting its Place.

When we are acquainted with the Caustick-Stone which we are to use, we know certainly when to take off the *Apparatus*, and can always avoid the Inconvenience of taking it off before it has form'd its Scar, and consequently save the Trouble of coming again Two Hours after, or of laying on another, as it sometimes happens: Nor are we to leave it on too long; for if the Stone be good, it may in a Child or Woman, whose Skin is most tender, have cut too deep, it acting more or less, according as the Skin which it attracts is more or less tender. If we find the Scar well, we take off

ff all the *Apparatus*, and with the Lancet
, make Two ſmall Inciſions croſsways in
e Body of the Scar; on which we lay the
ttle Bit of Linnen *P.* cover'd with a little
ſilicon or freſh Butter, and over that lay
e ſame Bolſter and Bandage: We conti-
ue the ſame Remedy until the Scar falls
ff, when we put into the Hole the great
ea *Q.* or a round Stopple made of Orrice
oot *R.* Some content themſelves with put-
ng in a little waxen Ball *S.* But the Peas
nd Orrice-Root are better, becauſe they
mbibe the Humidities of the Cautery, and
e take them out always bigger than we
ut them in, which keeps the Orifice of the
lcer, which inclines to contract and fill
p in a juſt Magnitude. We then lay on a
ttle Bit of white Linnen with a Hole at
e Place of the Pea *T.* and over that an
vy-leaf *V.* which is ſaid to be particularly
fficacious to procure a regular Suppuration,
e end then with the Bolſter *X.* and the
me Bandage as the Day before; we are to
ke Care to dreſs theſe Cauteries or Iſſues
wice a Day, and to make uſe of Linnen
hiten'd with Lye, if we would avoid an
l Scent, and if the Fleſh grows too much,
nd tranſcends the Edge of the Iſſue, it muſt
e conſum'd with powder'd burnt Allum.

When theſe Cauteries or Iſſues are made
n a dull Perſon, they are generally applied
o the Arms or Legs, that the Patient may
reſs them himſelf, and to that End, we
ake ſmall Bands ſhap'd like Stirrups *Y*, *Z*.
hich are very convenient for the Arms and
egs. But when they are made for Chil-
ren, they are made in the Nape of the Neck,
r three Reaſons; Firſt, becauſe in thoſe
hich have a great Head and Defluxions on
e Eyes and Face, the Cautery applied
ere better exhauſts the ſuperfluous Sero-
ies of thoſe diſtemper'd Parts, for which
s made uſe of. Secondly, Becauſe the
are of Dreſſing them is left to the Mothers
d Nurſes, and their Cap hides the Band
hich ſurrounds the Head. Thirdly, Be-
uſe in Children they are only made for a
me; and the Diſeaſe being over, we ſuffer
e Hole to cloſe up, after it has ſufficiently
rged the Patient: But when the Perſon
paſt Forty Years, he ought to keep it open
r the Reſt of his Life, if he would not run
the Riſque of falling into ſome grievous Diſtemper, which this Humour that ran through the Iſſue may in Time cauſe.

Of Cupping. From Fig. 57. *of the ſame Author.*

THE *Cucurbitula*, or Cupping-Inſtrument, is ſhaped like a round Box as big as the Fiſt, whoſe Entrance is narroweſt at Bottom, the Matter of which 'tis form'd is either Glaſs, Horn or Copper; but we at preſent make uſe of no other but thoſe of Glaſs, becauſe they are moſt proper, and that being tranſparent, we ſee what paſſes in them, and by that Means, know whether there have iſſued out a ſufficient Quantity of Blood before we take them off.

The Uſe of Cupping is as ancient as Surgery. *Hippocrates* mentions it, and *Galen* boaſts of its good Effects in the Cure of ſeveral Diſeaſes. We cannot doubt but that the Application of *Cupping-glaſſes* has its Excellencies and Advantages; but we are not oblig'd to make uſe of them in all the Caſes in which our Predeceſſors applied them, they gave too great an Extent to what *Hippocrates* and *Galen* left us in Writing on that Head: We are not to believe, for inſtance, that by applying them to the Top of the Head, they can relieve the Relaxation of the *Uvula*, or that being us'd on the Region of the *Ureters*, they ſhould be able to draw a Stone out of the Kidneys, or make it fall into the Bladder, and an infinite Number of the like Fancies.

As the World has acquired more perfect Knowledge in Anatomy, the Uſe of Cupping-glaſſes has become proportionably leſs frequent, they have been ſuppreſs'd in all the Diſeaſes in which they have been diſcover'd to be of no Efficacy: And we have retain'd the Uſe of them in thoſe where they afford the leaſt Relief, as in the Apoplexy, Lethargy, and all the Defluxions of the Head which attack the Face and Eyes. The *Italians* and *Germans* are not ſo much diſabus'd on this Head, as we are in *France*: In thoſe Countries we find they uſe moiſt hot *Stoves* or *Bagnio's*, to which they frequently reſort for Cleanlineſs-ſake: When they

they find themſelves too replete, and believe it to proceed from the abundance of Blood, they cauſe theſe little Cupping-glaſſes to be applied to ſeveral Parts of the Body, and by that Means draw out as much Blood as they think proper to relieve them. This Practice is not reliſh'd by the *French*, who are perſwaded, that by taking away ten or twelve Ounces of Blood, we with more Efficacy anſwer that End than by theſe ſmall Scarifications, which cannot let out any other than the ſubtil Blood, forcibly drawn from the Superficies of the Body.

Travelling in *Italy*, I went to ſee their Stoves: The People of Quality have them in their Palaces for their private Uſe, and in the Towns there are publick Ones, where any Perſon may go for his Money. There are ſmall Cupping-Inſtruments, *A, A.* which are call'd Cornets, becauſe made of Horn; they apply what Number, and to what Parts of the Body they think fit, becauſe the Perſon is ſtark naked in theſe *Bagnio's*. To apply them, they put them in a Baſon of hot Water, and taking them out one after another; to fix them on, they only put the End of a lighted Lamp *B.* into the Cornet, which being fill'd with Smoak, and inſtantly clapt on the Part, ſticks faſt there; they take it off in a ſmall Space of Time; and with a Sort of ſmall Flegm *C.* they make little Punctures, then they fix them on again in the ſame Manner; and thus, by ſeveral Cornets, draw out the Quantity of Blood which they judge neceſſary to their Health.

I had the Curioſity to viſit thoſe in *Germany*. They are large vaulted Rooms, in which there are Benches on both Sides, like the Forms of Colleges: They have two Apartments, in one of which the Men ſtrip themſelves, and in the other the Women, before they enter into the Stove: Both of them are naked, except only a Bit of Linnen which reaches from their Girdles to the Middle of their Thighs. As they enter, ſo they place themſelves, the Men on one Side, and the Women on the other: Being ſeated, a Servant comes and applies the *Cornets* to the Places which they direct him. I ſaw them applied to almoſt all Parts of the Body, of which I ask'd the Reaſon of one, who caus'd a *Cornet* to be apply'd to his Inſtep, why he did it there? He anſwer'd That it was againſt the Gout, and told me withal, that ſince from Time to Time he had applied it there, he had been free from that Diſtemper. The Servants or Attendants in theſe Places are ſo us'd to put on theſe *Cornets*, that they do it with a ſurpriſing Readineſs and Addreſs: They make the Punctures with a little Flegm, which they hold in one Hand, filliping it with the other; they make theſe Punctures in what Shape they pleaſe, ranging them next one another; ſome of them repreſent the True Lovers Knot, others a Heart, and others the Cyphers of their Miſtreſs's Names, agreeable to the Deſire of the Perſon cupp'd. In ſhort, they are ſo fully perſwaded of the good Effects of theſe *Bagnio's*, that they deprive themſelves of all Things, rather than miſs them; and indeed, the Women which go there have a very fine Complexion, for the Sweat diſcharges thoſe Impurities which ſpoil the Skin.

There is another Sort of *Cornets D, D.* which are us'd at *Bourbon*; they are the ſmall Ends of Horns a little long, and pierc'd at the ſharpeſt Ends; they lay the wideſt End on the Place where the Application is to be made, and at the narroweſt they ſuck, to draw the Skin into the Cavity of the *Cornet*. He which performs this Suction, has in his Mouth little Globules of Wax *E, E.* with which, by Means of his Tongue, he ſtops the Hole at which he ſuck'd, and proceeds on to another, and ſo on, laying on as many as are neceſſary. There are two Sorts of Cuppings, the one which are call'd dry, becauſe they conſiſt in the bare Appoſition of the Cupping-glaſs, without drawing out any Thing that wets the Skin; and the other which we call Humid, becauſe they make Scarifications to draw out the Blood. The Surgeon muſt at leaſt have two Sorts of Cupping-glaſſes of different Sizes, the leaſt *F, F.* for Children, *&c.* and the larger *G, G.* for grown Perſons, or thoſe Occaſions which require a ſtrong Suction.

In order to apply them, we are to ſeat the Patient in a proper Poſture, which depends on the Place where the Application is to be made: But as we ſeldom uſe them to any other Part than the Shoulder, we ſhall ſuppoſe

ppoſe them to be fix'd on that Place. If he Patient is in a fit State to riſe, we may lace them in a Chair, with his Head inlining forwards, and reſted on a Pillow id on a Table before him: If he be in a ethargy or Apoplexy, he muſt be laid on is Belly, and after having uncover'd his houlders, they are to be rubb'd hard with everal hot Napkins, to warm the Parts, nd draw the greater Quantity of Blood ither.

We cauſe the Light *H.* to be held by a ervant, as well to ſee clearly what we do, s to light the Bits of Tow *I, I.* or the mall Wax-Lights *K, K.* Some take fine ow and put it into the Cavities of the upping-glaſſes and light it there, then fix he Cupping-glaſs on the intended Place, nd it faſtens immediately: Then apply nother, which they place beſide the Firſt, nd having caus'd to be brought to them a ery hot Napkin folded ſeveral times dou-le, they clap it on the Cupping-glaſſes, nd a little while after we renew the Apolication of the Napkin, which we coninue on, till we think it proper to take off the Glaſſes, in order to make the Scarifiations.

Inſtead of Tow, 'tis much better to make uſe of the ſmall Wax Candles ſtuck on a ittle round Piece of Card, they yield a greater Flame than the Tow, and conſequently the Cupping-glaſſes draw ſtronger, nd we don't with theſe Ends of Wax-Candle run the Riſque of Burning the Patient as we do with the Tow. We are to obſerve, that when we apply the Cupping-glaſſes to a young Girl or Woman, we are to place them lower than when we uſe them to Men, becauſe the Scarifications leave little Marks which disfigure the Shoulders, and which would make the Ladies uneaſy to have them in a Place where they may be ſeen, for Women do not value thoſe Defects which they can hide. The Cupping-glaſs is taken off, by preſſing a little on the Skin with the Finger to let in the Air: We then take the Lancet *L.* with which we make ſeveral Scarifications on the Place where the Glaſs has been apply'd; we begin at the lower End of the Circle, where we make three Scarifications; we continue mounting upwards, where we make four, then five above them, then four, and end with three, ſo that they are all interlaced in one another's Spaces, in manner as repreſented by the Figures *M.* We light the Wax-Candles, which we place on the ſcarified Places, and then over them apply the ſame Cupping-glaſſes; we do the ſame Thing to the Second; we cover them with a very hot Napkin, and repeating the Applications of theſe Cloths, we ſee whether they fall with Blood; and when we judge there is enough, we call for a Veſſel to put the Blood into which was contain'd in the Cupping-glaſs.

If the Phyſician, who is commonly preſent, in theſe Diſeaſes which require a quick Evacuation, thinks fit to apply them a ſecond Time, we muſt have other Wax-Candles, becauſe the Firſt being wetted with the Blood, cannot be lighted again: And as to the reſt, we are to proceed the ſecond Time as we did the firſt, and a third Time reiterate the Operation if Neceſſity requires. The Operation ended, we are to dry up all the Blood very clean, waſhing the Shoulders with warm Wine, and lay on the two Plaiſters *N, N.* on the two Places where we have made the Scarifications. They are of burnt Ceruſe, becauſe nothing is now to be done, but to dry them up; they are to be renew'd ſome Days after, which is to be done till the Patient is perfectly cured.

Of applying Bliſters *and* Leaches. *From* Fig. 58. *of the ſame Author.*

Leaches are little Aquatick Worms which we find in Lakes and Rivers: Theſe Inſects frequently faſten on the Legs of thoſe which bath or waſh themſelves, and to the Feet of Horſes when they are watering: They are call'd Horſe-Leaches and Blood-Suckers, becauſe they ſuck the Blood of all Animals they are apply'd to. They are of two Sorts, the Good, and the Venemous: The Good are thoſe which live in running Waters, they are long and ſlender, have a ſmall Head, their Back Green ſtriped with Yellow, and their Belly a little Red: Theſe are thoſe *A, A.* which we are to make uſe of. The Venemous are in ſtanding Waters, Ditches and Bogs: They are thick, have a great

a great Head, and the Back ſtrip'd with Blue. Theſe we are to reject. We frequently apply Leaches to ſuch Parts as cannot bear either Bleeding or Scarifications, as, the Face, the Lips, the Gums, the Noſe, the *Anus*, *&c.* to which laſt they are apply'd to evacuate the Piles. Leaches ſupply the Place of Bleeding, their Sting or ſharp pointed Needle performing the Office of the Lancet.

We are to apply Leaches when freſh taken, firſt letting them diſgorge themſeves in Water. When we would uſe them, we are to take them out of the Water, and ſhut them up cloſe the Evening before we uſe them, to render them the more greedy. When we apply them with our Fingers, they may chance to ſtick to them, or ſometimes will not bite; wherefore we are rather to hold them on a Bit of Linen *B.* till they faſten on the Skin. We always uſe them the ſame Way, and place a ſecond, a third, and as many as are neceſſary. When theſe Leaches are thus faſten'd on the Part, they ſtrike out of their Head a Sting, which is nothing but the Point of their *Proboſcis*, which is like a Tube, ſo diſpoſed, that it folds it ſelf to ſhorten it, and unfolds to lengthen it ſelf; ſo that when the Leach attempts to draw the Blood of any Animal, it extends its *Proboſcis*, and ſearches for a Pore in the Skin to introduce it, and thruſt it in far enough to find the Blood, which aſcending into the Cavity of this Trunk, that Way enters the Body of the Leach.

The Leaches don't quit their Hold before they are ſatiated: If they fall off too ſoon, we apply others to the ſame Orifices. When they are full, and we would not have them fall off, we cut off their Tails with a Pair of Sciſſars, and from thence ſee all the Blood diſtil which fill'd them, ſo that they void by the Tail the Blood they receive by their Trunk, like an Air-Pump; and thus one of them alone will draw more Blood than ſix others whoſe Tails are not cut off. When we believe we have drawn Blood enough, we are not to tear off the Leaches, leſt they ſhould leave their Stings behind them; but to make them quit their Hold, lay a little Salt-petre, or common Salt, on their Backs, and they will looſen immediately. We are to ſuffer the Blood to run out a little, that no Venom may remain behind. We are to waſh the Punctures with [W]ater, and if the Blood does not ſtop of [it]ſelf, we are to lay on a little ſcrap'd Lint [or] burnt Linen *D.* We may lay on [the] Plaiſters *E. E.* a little Bolſter *F.* and a Ban[dage] *G.* roll'd at both Ends.

The *Veſicatory*, or *Bliſter*, is a Medicame[nt] prepar'd from *Cantharides*, or *Spaniſh Fli[es]* which being laid on the Skin, by its Acr[i]mony raiſes Bliſters or Bladders, whence [it] is call'd the *Veſicatory*. This Remedy is pr[e]par'd from the Flies *Cantharides* dry'd an[d] powder'd, which we work up with Leave[s] and a little Vinegar, in order to make [it] into a Maſs. The Authors which direct [it] to mix Vinegar with it, tell us, that th[e] Fermentation which muſt ariſe from th[e] Mixture of the Vinegar with the alkalio[us] Salt of the *Cantharides*, augments the Vertu[e] of the Veſicatory. Others affirm, that th[e] Acid of the Vinegar enfeebles the Actions [of] the Veſicatory rather than encreaſes it, ſin[ce] it enervates the volatile Salt of the *Canthar[i]des*, on which depends all their Force. I don't know which of them is in the righ[t] but muſt ſtick to my own Experience; fo[r] when I have added a little Vinegar, I kno[w] that they have very well anſwer'd their d[e]ſired End.

We make Uſe of Bliſters in ſeveral D[i]ſtempers, which require the lively Agitatio[n] of the Fibres, and the violent drawing o[ut] of the Seroſities; as, in Apoplexies, Epile[p]ſies, and Hemieraries. In thoſe Caſes w[e] lay them on the hind Part of the Nec[k] preparing the large Plaiſter *H.* which w[e] lay betwixt the Shoulders. Bliſtering is a excellent Remedy againſt the Bitings of v[e]nemous Beaſts, and againſt the Gout. W[e] cover with this Compoſition the Bit [of] Linen *I.* which we lay on the bitten Pla[ce]. They are alſo excellent in Defluxions on t[he] Ears and Eyes, when we ſpread on the Pl[a]ſter *K.* ſhap'd like a Creſcent, and lay it [on] behind the Ear: And we are reliev'd in t[he] Toothach by laying the ſmall round Plai[ſter] *L.* on the Temporal Artery.

The Surgeon is to make his Veſicato[ry] ſtronger or weaker according to the Part a[nd] the Diſeaſe. He is to allow a leſs Quanti[ty] of *Cantharides* to a Girl or a Woman, b[e]cauſe their Skin is tender, eſpecially wh[en] he applies it to the Temple, or behind t[he] Ear.

ars; but he may enlarge his Quantity for n old Woman, becauſe of the Hardneſs of r Skin. If he applies Veſicatories to the houlders for the *Apoplexy* and *Epilepſy*, or o the Thigh for the Gout, he muſt allow nough to raiſe a great Number of Bliſters, nd draw out a greater Quantity of the ſeous Humour.

Before he lays on the Bliſter, he is gently o rub the Part, that the Veſicatory may are the more expeditious Effect. He is to eave it on four or five Hours, and ſometimes longer, according to the Tenderneſs nd Diſpoſition of the Patient. When the *pidermis* is riſen in Bliſters, the Pain ceaſes o be ſo great, and theſe Bliſters being full f ſerous Humour, he is to open them to t it out. He alſo cauſes it to run out for ome Days, by laying on the Pear-Tree Leaf *M.* and the more he cauſes it to run out, he more the Patient is eas'd, and deliver'd rom the preſſing Danger, which is the End ropoſed in this Operation. When they ave run enough for two or three Days, he pplies Deſiccatives to heal them.

We find at preſent in every Apothecary's hop a Compoſition of the Bliſtering Plaiter, which is more commodious than that f which I have been ſpeaking. When we ould not raiſe ſo many Bliſters, we ſpread he Compoſition on a little Bit of Linen or affeta, when 'tis to be put behind the Ears, and on the Temples, which Plaiſter deceiv'd a Waiting Woman, whoſe Story runs as follows:

A Lady of Quality, immediately after her Delivery, order'd one of her Women to prepare her a Plaiſter of Madam *Fouquet*'s aſtringent Ointment, which ſhe had given her to be laid on the Navel. Two or three Hours afterwards this Lady ſent for me to ſhew me a great Clot of Blood which ſhe had juſt voided, and took to be a falſe Conception, withal exaggerating the Obligations which ſhe had to that Plaiſter, and the good Effects it produced on all thoſe who made Uſe of it after their Delivery. A few Hours after the ſame Lady ſent for me again, being very much alarm'd with a Swelling which was riſen on her Navel, telling me that her great Guts were come out. I found it to be a great Bliſter occaſion'd by this Plaiſter, which was not that of Madam *Fouquet*'s, but a Veſicatory. I pierc'd the Bliſter, and it not being neceſſary to procure the iſſuing out of the ſerous Humour on this Occaſion, becauſe that Part of it which form'd the Bliſter, and cauſed all the Pain, immediately run out of it ſelf, I laid a Plaiſter on it to dry it up preſently. The Waiting Woman had two Plaiſters in her Trunk, and miſtook the Veſicatory for that of Madam *Fouquet*'s, which ſav'd the Lady's Life whilſt ſhut up in the Trunk.

A curious Tract of Tumours in General: Taken from Monſieur St. Hilaire's *Anatomy of the Humane Body, and its Diſeaſes.*

A Tumour, according to *Etmuller*, is when the natural Bulk of a certain Part is encreas'd beyond Nature in Length, Depth and Breadth. he general Cauſes of all the Tumours, or the Augmentation of the Bulk of the arts, are, Firſt, the Parts themſelves when ut out or diſlocated from their natural Poition, and fall upon the adjacent Parts, as may be ſeen in Ruptures and Luxations, which are always attended with Tumours: Secondly, ſome Humour which encreaſes the Part, becauſe its circular Motion being ſtop'd, it goes into a Coagulation, a new Humour being progenerated: Thirdly, flatulent Humours, which will bloat up the Part, for it often happens, eſpecially upon the Knees, that certain Tumours ariſe, fill'd

up only with Flatulencies, which ſometimes are miſtaken for an Abſceſs before they are laid open.

The Settlement or Coagulation of a Humour produces Tumours; for the circular Courſe of the Humours being interrupted in the Channels of the Parts, and in the capillary Veſſels, it cauſes a ſimple Coagulation, or elſe a gradual Congeſtion by little and little. The Firſt is to be obſerv'd in the Common Tumours, the Second in the Critical, and other ſuch like Tumours. In the Firſt, all the Humour that is circulated is ſtop'd indifferently; in the Second, there is made a Sort of Filtration, ſo that certain Particles of the Humours are ſtop'd in their Courſe, whilſt the reſt continue their Circulation.

The ſimple Coagulation, in reſpect to the Blood, is the Cauſe of all Inflammations, Contuſions, of the *Eryſipela's*, and other Tumours of the ſame Nature; but that of the *Lympha* produces œdematous and ſerous Tumours, Dropſies as well univerſal as particular, unto which we may add alſo the Concretion of the Milk in the Breaſts, and the *Lochia* when return'd to the *Matrix*.

A Congeſtion which is made gradual, by little and little, is the Occaſion of Critical Abſceſſes and Tumours, and this happens when the more groſs Particles of the febrile Ferment, and ſuch as are not of an eaſy Digeſtion, are ſtop'd in their Courſe by reaſon of their groſs Subſtance, of their Concretion or Gathering into a Body, whilſt the Blood and the *Lympha* continue their natural Courſe and Circulation.

Hence we ſee ariſe the Peſtilential *Bubo's*, *Parotides*, *&c* as likewiſe the Scirrhous Tumours of the *Viſcera*, and of the *Glands*; for the moſt viſcous Part of the Blood and of the *Lympha* is very apt to entangle it ſelf to ſome Part, whilſt the thinner Part continues its Courſe, which produces a Swelling in the Part; and in this Manner the Tumours, owing their Origine to a Coagulation, do ariſe.

The other Tumours date their Riſe from a Humour which is progenerated or gather'd afreſh in the Part; as, when the nutritious Juice deſign'd for the Nouriſhment of the Part is ſtop'd, and gather'd beyond what it ought to be, and this nutritious Juice is either quite corrupted, or elſe alter'd too li or too much.

It is corrupted, when ſome vicious ment, which lies conceal'd in the Part, ma the proper Nouriſhment that is carried the Part degenerate into diverſe vitious corrupted Juices, which gathering by grees into a Body, produces a Tumour; thence it is that we ſee Abſceſſes and Ul even after their Mundification produce fr Ulcers and Abſceſſes, which commonly, erroneouſly, is attributed to the Defluxi that fall upon the affected Part; and he it is alſo, that a *Caries* in the Bone, if it not very well cur'd, does after the Conſo dation produce a freſh Ulcer and a fr Abſceſs.

To the ſame Cauſe may be referred Venereal *Bubo*, which is gather'd ſucceſſi ly in the Glands and Arm-pits, after a M has had carnal Converſation with a Wom infected with the Venereal Diſeaſe; as lik wiſe the Nodes, the Cancer in the Bre Pocky *Exoſtoſes* or Nodes, all which o their Origine to the Malignity of an ac or cauſtick Venom, which corrupts the pr per Nouriſhment of the Bone, and produ theſe Tumours.

Our Nouriſhment or Aliment being r ſufficiently alter'd or chang'd, and diſtrib ted in too great Quantities to the Parts, there produce certain Tumours, which ha ſomewhat of a Reſemblance to one anothe ſuch are the callous Tumours of the Bo where there has been a Fracture, Excreſce cies, and the proud Fleſh in the Ulcers af they are cleans'd, the prodigious Increaſe the *Viſcera*, Ganglions, *&c*.

The Nutriment which has undergone t great an Alteration being gather'd in a certa Part, do penetrate alſo Tumours, which a not unlike each other; as Warts, the *Po pus*, or any Thing that has a Relation Warts; likewiſe all ſuch Tumours as a contain'd within their proper Membran as the *Atheroma*, the *Steatoma*, the *Meliceri* and others of that Nature.

The Concretion or Coagulation of t Humours has its Origine from ſome Def of the *Tubuli* or Channels, which hinder due Circulation, either becauſe they are t ſtraight, or elſe from a vicious Diſpoſiti of the Humour, which is incapable of p

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rming its circular Courſe, by reaſon of Thickneſs, or elſe becauſe its Particles e not duly proportion'd to the Configura- on of the Pores of the Part.

The *Tubuli* or Channels and the Pores may ſtraightned, either by a Compreſſion from e adjacent Bodies, or by a Ligature, or an bſtruction caus'd by ſome mucilaginous d viſcous Matter, which has been coagu- ted by Cold, ſome acid Juice, or elſe by e Contraction and Straightneſs, or rather oſing up of the Fibres of the Part, occa- on'd by the Violence of Pain, which muſt Neceſſity cauſe a Conſtriction of the ores.

The Thickneſs or groſs Subſtance of the umour, and the Concretion, which is the onſequence of it, is owing to the Chyle, hen it is too crude and viſcous, for Want being ſufficiently ſubtiliz'd, in the firſt, cond and third Concoction, or elſe to the old, or to an Acid which thickens and agulates the Humour, or elſe perhaps to me incraſſant external Remedy apply'd pre- fterouſly, which ought to be a ſufficient otive to us to reject all Repercuſſives and ſtringents in Fractures and Luxations, leſs they are manag'd with the utmoſt rcumſpection. Laſtly, the Configuration the Particles of the Humour do alſo pre- nt its paſſing through the Pores. It hap- ns alſo ſometimes, that theſe Particles be- g as it were entangled within one another, a Motion of Precipitation they are in me Meaſure ſeparated from the Maſs of ood, yet ſo as that they ſwim in it, and thus carry'd along with it to the Pores the Parts, where they are detain'd, whilſt reſt of the Blood continues its Courſe th Eaſe. Thus we ſee it happen in Cri- al Abſceſſes.

Our Nutriment, though never ſo well er'd, is able to produce Tumours by ga- ring into a Body *contra Naturam*, in caſe re is ſome corrupted Ferment in the Part, more eſpecially one of an acid malig- nt Quality, which changes and makes the uriſhment diſtributed to that Part dege- ate into many vicious Juices, which ga- ring by little and little, produce Tumours Abſceſſes.

The Nutrition, whenever it has not un- gone a ſufficient Alteration, is alſo ca- pable of producing Tumours in caſe of ſome external Cauſe; as for Inſtance, hard Tra- velling, whereby the Pores are dilated, and the Fibres too much ſtrain'd, and upon that Account receiving too great a Share of Nou- riſhment, the ſame is retain'd and congeal'd betwixt their diſunited Membranes.

Thus we ſee, that the Diſtention of ſome Tendon of the Hand, occaſion'd by hard Labour, produce at long run a *Ganglion* in the Toes; and in the ſame Manner, if a Compreſſion or Attrition of the Tendons of the Toes be occaſion'd by a Shoe that is too ſtraight, it produces Corns, *&c.* according to the Conſtitution of the Part affected.

Laſtly, in caſe the Nutriment happen to have undergone too great an Alteration, though without any Corruption, yet it will produce Excreſcencies enclos'd in their pro- per Membranes, which, according to the Alteration of the ſeveral nutritious Juices which are filtrated through the ſeveral Mem- branes, are fill'd either with an oily or greaſy, or elſe with a gelatinous, Matter, or ſome other ſuch like Subſtance, having ſome Reſemblance to that Matter by which it is produc'd.

The *Polypus* and *Warts* have their Origine from this Matter, but this very ſeldom hap- pens without ſome previous Force, or ſome external Violence; for unleſs there be any ſuch external Effort, theſe Tumours very ſeldom make their Appearance, unleſs there has happen'd a ſlight Corroſion, caus'd by a corrupted Acid; and thus we ſee ſometimes a *Polypus*, for Inſtance, riſe out of a ſmall Ulcer of the Noſe.

A particular Account of the ſeveral Sorts of Tumours, taken from the ſame Author. And firſt of the Phlegmon.

THE *Phlegmon* or Inflammation is a Tu- mour ariſing in the fleſhy Parts, accom- pany'd with Heat, Redneſs, Pain and Pul- ſation, owing its Cauſe to the Concretion of the Blood, and of the other Juices, in their Channels, or extravaſated beyond theſe Veſſels. The Swelling, according to *Etmul- ler*, is caus'd by the Obſtruction which ſtops

up the Paſſage of the Veſſels, ſo that the nutritious Juice of the Part is oblig'd to ſtop in its Courſe: The Heat ariſes from the Fermentation of the Juices caus'd by the *Materia Subtilis* of *Des Cartes*. The Redneſs owes its Riſe to the Tumefaction of the Veſſels from the too great Quantity of Blood; the Pulſation and Pain muſt be attributed to the exceſſive Tenſion of the Arteries, and to the Irritation occaſion'd in the nervous Fibrils, by the acrid Particles of the concreted Juices.

A great *Phlegmon* is always attended with a Fever, becauſe the vicious Ferment of the Tumour being convey'd into the Maſs of Blood, does excite there a Fermentation, in which the Nature of a Fever does conſiſt. The Cauſes of a *Phlegmon* are either internal or external: The External are ſuch as Contuſions, Fractures, Prickings, Wounds, a diſorderly Uſe of the *Non Naturals*, which of themſelves are able to cauſe an Inflammation: As for Inſtance; ſuppoſing a certain Part to have ſuffer'd a Contuſion, the Fibres are then compreſs'd and ſtraightned cloſe together by approaching near each other, the Blood and the other nutritious Juices are chaſed from their Channels, and expand themſelves betwixt the Interſtices of the Fibres: In this forcible Extruſion of the Blood and of the other Juices, the Situation and Series of their Fibres being not the ſame as they us'd to be, the Pores of the alcalious Particles, thro' which the *Materia Subtilis* us'd to have its free Courſe, alter their Figure, become oblique or more ſtraight in the Middle than in the Surface, or elſe theſe Pores are taken up by the acid Salts which have broken their Chains. The etherial Matter which paſſes without intermiſſion thro' all the Pores of the Parts of our Body, finding their Way ſtraightned or ſtop'd up, enters not without Violence into the Alkalious Pores of the Blood; but meeting with a Check, ſuch an Obſtacle as it is not able to ſurmount, is reflected back and thrown into the Blood, and there cauſes a rarify'd Motion: This unequal and irregular Motion does continue as long as the *Materia Prima Elementi* meets with any Obſtacle that hinders or ſtops its Motion in a ſtraight Line, and that with the ſame Celerity as its natural Agitation does require: That is, its Motion will continue fo long Time, as the Acids are engag'd wi in the Pores of the Alkalies; ſo that acco ing to this Suppoſition it is requiſite, t either the alkalious Particles are grin into moſt minute Atoms, or elſe that Acids are chaſed from their Pores, bef this Motion can ceaſe.

When the Alkalies and Acids are int mingled with each other, the ſulphure Particles, which were join'd before with Alkali, are left alone in the ſerous Part, a then being compreſs'd on all Sides by Phlegm, their ſmall Ramifications are tangled together, which compoſing a g mous Matter, and this being thruſt into Extremities of the Channels, do ſtop their Orifices, ſo that the Blood and other Juices can't maintain their Circu tion thro' them; and this Concretion co tinues till ſuch Time that the Alkalies ing diſengag'd from the Acids, and reu ted a-freſh with the ſulphureous Partic do diſentangle and extend all their Ra fications.

In thoſe Fractures where there are ſo Pieces of the Bone ſeparated from Whole, which cauſe a Compreſſion piercing in the Fleſh, you will always m with a *Phlegmon*, for the *Tubuli* being eit compreſs'd or torn in Pieces, the nutriti Juice does either ſtop, or elſe is extravaſa in the Fibres of the Part: A convinc Argument, that all the other Inflamm tions are caus'd by the Humours being c geal'd and coagulated in the *Tubuli* of Parts.

From what has been ſaid in relation the Explication of the *Phænomenon* of an flammation, it is evident, that it is not ly the Bile or the Blood that cauſes *Phlegmon*, as the Ancients would have but all the other Juices likewiſe, w either they are extravaſated or ſtop'd their circular Motion; it being beyond Diſpute, that the greater the Quantity of extravaſated Juices is, the more conſide ble is the Inflammation, and the Fibres the Part being the more tumefy'd and tended, this encreaſes the Violence of Pain.

Every Inflammation therefore preſ poſes a Tumour, and every Tumour an
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truction; for in every *Phlegmon*, Regard muſt be had to two Things, *viz.* the Parts that are ſhut up or obſtructed, and thoſe that cauſe this Obſtruction; the Difference of the *Phlegmon* ariſing either from the Structure of the Parts, or elſe from the Nature of the Particles which cauſe this Obſtruction, which may be either Saline or Alkalious, either Acid or Sulphureous.

A *Phlegmon* which ariſes in the tendinous and membranous Parts, is not ſoon diſpers'd, but is moſt commonly of a long Continuance; whereas a *Phlegmon* in the fleſhy Parts is ſoon removed. An Inflammation which is not carry'd off by inſenſible Tranſpiration, paſſes into a Suppuration, and then may eaſily degenerate into a Gangrene, by the ſiniſter Application of cold and aſtringent Remedies. An Inflammation of the internal Parts is very dangerous, and proves oftentimes mortal, and the greater it is, the more dangerous.

In caſe a *Phlegmon* happens to light upon thoſe we call the Noble Parts, there is no Hopes of Life. Inflammations are much eaſier cured in young People, than in ſuch as are far advanced in Years; becauſe the Parts of the Body of aged Perſons, and their nutritious Juices, abound with more fix'd Salts than the others. The Prognoſtick of a *Phlegmon* may be taken alſo from the ſeveral Degrees of the Malignity of its Cauſes and the Violences of the Symptoms. If an Inflammation ariſes in the glandulous Parts, it is not without Danger, becauſe theſe Parts are very ſubject to be gangren'd. Laſtly, a *Phlegmon* attended with exceſſive Pain, is not near ſo ſoon cured, as when the Pain as well as the Heat are pretty moderate.

An *Abſceſs* owes its Origine to a Humour which is thrown upon the Part, becauſe its circular Motion has been check'd or ſtopp'd by reaſon of its groſs Particles, or elſe by ſome Obſtruction, *viz.* When the *Tubuli* and Pores are too much ſtraightned, either by ſome Compreſſion from the adjacent Parts, or by too ſtraight a Ligature, or by an Obſtruction caus'd by ſome viſcous and mucilaginous Matter, which is congeal'd by the Cold, or coagulated by ſome Acids: Or, laſtly, by the Contraction and Conſtriction of the Fibres of the Part, occaſion'd by exceſſive Pain. The Groſſneſs and Thickneſs of the Humour, and the Concretion which enſues is owing to a crude or viſcous Chyle, ſuch as has not been well prepar'd in the *Viſcera*, or comes from a cold or acid Humour which congeals and coagulates, or elſe from an incraſſating prepoſterous external Application as aforeſaid.

An *Abſceſs* is diſtinguiſh'd into two Sorts, for ſome are contain'd in their proper *Cyſtis*, Bag or Covering, and others are without it. An Abſceſs where the Matter is enclos'd within a Covering, is ſubdivided into three Sorts: Thoſe which contain a Subſtance like a Jelly, are call'd *Atheroma*; others there are whoſe Matter is like Honey, call'd *Meliceris*; and the third Sort which looks like Suet or Greaſe, are nam'd *Steatoma*.

There are alſo ſome *Abſceſſes*, which contain ſome extraordinary Matter in them, as Hairs, oſſeous or bony Bodies; and others hard Matter, endurated, reſembling Shells, Stones, *&c.* The Signs by which we may diſcover an approaching Abſceſs, are an exceſſive Pain of the Part, an Inflammation, a Pulſation, and a gradual Augmentation of the Tumour. As ſoon as the purulent Matter is gathered, the Pulſation and Pain ceaſes, the Swelling is not ſo hard as in the Beginning, when an exceſſive Tenſion is perceived, but now turns white in ſome Places. The purulent Matter which iſſues from the Abſceſs is not always the ſame, but leſs or more Corroſive, of a livid, greeniſh, or white Colour, ſometimes thin, ſometimes thick, all which depends on the Nature of the Tumour, and on the Length or Shortneſs of Time, the purulent Matter has been lodg'd in the Parts, as likewiſe on the different Texture of the Humour: Thus if it contains abundance of acrid, corroſive, and ſaline Particles, the purulent Matter which comes from it, will, beyond all diſpute, be alſo ſharp and corroding.

The Prognoſtick of Abſceſſes muſt be regulated, either in reſpect to the affected Parts, or in Reference to the Cauſes; there is beſides theſe another, unto which the Ancients have given the Name of a *Critical Abſceſs*, which making its Appearance ſometimes in acute Diſeaſes, is cauſed by a Congeſtion of the morbifick Matter; and this

Criſis

Criſis proves ſometimes Salutiferous and ſometimes Mortal: But an Abſceſs without a *Criſis*, is for the moſt Part not attended with much Danger, and requires nothing elſe but an Evacuation of the purulent Matter to accompliſh the Cure: Nevertheleſs, an Abſceſs proves more or leſs Dangerous, according to the Nature and Circumſtance of the Part: Or elſe, in caſe you delay the Opening of it, it may be attended with very ill Conſequences, as Fevers, or Convulſions, and *Sinus's* in the adjacent fleſhy Parts; likewiſe the Bones will be ſeis'd with a *Caries*, and will fall off, and exfoliate to the very Marrow. The *Pus* or Matter from an *Abſceſs*, which is commonly called Laudable, has a near Reſemblance to the Chyle or the nutritious Juice; whereas on the Contrary, the purulent Matter is not commendable, but acrious; it cauſes a Fermentation of the Blood, which proves the Occaſion of a Fever, it corrodes and gnaws to pieces the Veſſels, and cauſes conſequently an Extravaſation of the nutritious Juice.

The *Sinuſſes* or Sinuoſities proceed from the acrimonious Particles of the *Pus* detained in the Abſceſs. When this *Pus* by its Acrimony has corroded the *Tubuli* and Fibres of the Part, the nutritious Juice contain'd within theſe *Tubuli* extravaſate, and their moſt volatile Particles being diſſipated, there remains nothing behind but the groſſer Parts, which ſticking cloſe to the Sides of the Veſſels, render them callous.

The *Sanies* or purulent Matter that iſſues from ſuch a *Sinus*, if it be clear, green, black or putrid, muſt be look'd upon as a very bad Sign; as on the Contrary, when the ſaid *Pus* appears white, of the Conſiſtency of the Chyle, equal and every where of the ſame Conſiſtency, without any ill Scent, it gives Hopes of a ſpeedy Cure: Thus if the Pain ceaſes and the Tumour diſappears, it is a good Sign.

If when you preſs the Part together the Patient is very ſenſible of Pain, there's ſufficient Reaſon to imagine that the nervous and tendinous Parts are gone into an Ulceration. If a clear black and ill ſcented Liquor iſſues from the *Sinus*, 'tis a Sign that the Bone is infected with a *Caries*; but if the *Sanies* be thick and viſcous, the *Sinus* has not penetrated beyond the fleſh Parts.

The Acrimony of the *Sanies* ariſe fro nothing elſe but the great Quantity acid Particles, which are mix'd with t nutritious Juice; its offenſive Scent mu have its Riſe from the groſs ſulphureo Particles, which are intermix'd with th putrid ſaline Ones; its yellow Colour pr ceeds from the Mixture of the Salts and Su phurs, which impart ſuch a Contexture the Surface as appears of a yellow Colou to the Eye. Theſe *Sinus's* are very difficu to be cured, in caſe they become hard an callous.

Of the Bubo, *and the* Anthrax. *From the ſame Author.*

THE *Bubo* is a Tumour which moſt commonly ariſes under the Armpits, in the Groins, or near the Ears, and is accompany'd with an Inflammation, Heat, Redneſs, Pain, and a Pulſation. There are two Sorts of *Bubo's*, *viz.* one Simple, which is not attended with any ill Symptoms, and the other Malignant; this laſt is ſubdivided into the Venereal and Peſtilential *Bubo*.

A ſimple *Bubo* does moſt commonly affect young People, which is look'd upon as a Sign of their Growth; whereas on the Contrary, a malignant *Bubo* is the Effect either of a Plague or *French*-Pox. A *Bubo* has its Origine from the Blood, or from the *Lympha*, which being turn'd acrid, is entangled within the *Tubuli* of the Glandules. A *Bubo* is frequently the Attendant of a Fever, becauſe every Thing that is acrious in the Maſs of Blood, is capable of producing a Coagulation, which ſettles it ſelf within the cutaneous Glands and the capillary Veſſels, which is the Reaſon why in the Plague, where the Blood is overcharg'd with ſuch Particles, theſe *Bubo's* are moſt frequently obſerv'd. Malignant and peſtilential Fevers with the Plague, which don't differ one from another but in Degrees, have no other Origine, according to *Etmuller*; but what ariſes from theſe rigid, oblong, and ſharp-edg'd Particles, which come from Time to Time from ſubterraneous Materials, which contain

ntain abundance of Arſenical Salts; theſe ing mix'd with the Air, and mingled ith the Maſs of Blood by Inſpiration, ake a dreadful Havock in the Body, by inuating themſelves into all the Fluids, d coagulating their Sulphurs.

Theſe Sulphurs thus coagulated, act in ppoſition to the Motion of the Blood and e other Juices, by obſtructing the *Tubuli* of e Glands; and the *Alkalies* and their Pores ing obſtructed likewiſe by the pointed ſa- e Particles, the *Materia Subtilis*, which s no free Paſſage thro' them, is carried by Reflux into the Blood, where it puts the hole Maſs in Confuſion and Diſorder, by uſing a Separation or Seceſſion of its Prin- ples. The *Venereal Bubo* is moſt common- caus'd by ſome cauſtick and acid Particles oduced by a corrupted Humour, infi- ating it ſelf, or rather being convey'd in- the *Urethra*, paſſes from thence by the nguineous Veſſels of that Part into the Maſs Blood. The Acid will not tarry long in e Blood without diſcovering it ſelf by the lterations it induces there; for by its be- g united with the alkalious Particles, the lphureous are coagulated, and theſe coa- lated Sulphurs, and the other Particles arg'd with and penetrated by the acrious lts, being carry'd by Means of the Circu- ion into the Glands of the Groin and mpits, they ſtop there, and cauſing Ob- ructions, prove ſo many Obſtacles to the otion of the Blood, and the free Courſe Perſpiration.

A ſimple *Bubo* is beſt diſcover'd by a Tu- our, which reſiſts the Touch by its Red- s, Pain and a ſlight Fever. When a *Bubo* pears all at once, without any previous aniſeſt Cauſe, it is call'd Symptomatick. *Bubo* which appears after a Diſeaſe, is d a Critical *Bubo*: But a peſtilential *Bubo* accompany'd with moſt dreadful Symp- ms, becauſe it is follow'd by all the mptoms of the Plague: The Glands un- the Armpits are moſt generally the Seat the peſtilential *Bubo*, tho' ſometimes they ke their Appearance alſo in the Glands of Groin, whereas on the Contrary, the ve- eal *Bubo* does almoſt conſtantly ariſe in Groin, and ſeldom in the Arm-pit: But *Bubo* is attended with ſome Symptoms of Pox it ſelf.

When a *Bubo* makes its firſt Appearance, it is of a pale-red Colour, after which, it turns more Vermilion, and ſometimes is of a Dark-red inclining to Black, and is never without much Heat and Inflammation. Sometimes the Tumour lies lurking for a conſiderable Time very deep under the Skin, and then the Glands are moveable, till at laſt they grow conſiderably bigger, and then become immoveable, hard and cloſe. After this the *Bubo* makes its Appearance, ſometimes before there are any Signs of a Fever, or ſometimes alſo after the Fever, to the no ſmall Surprize of the Patient: All which muſt be attributed to the Diverſity of the Matter which produces the *Bubo*, and which requires either more or leſs Time to diſengage it ſelf. When a *Bubo* is a long while before it can be brought to a Suppuration, it turns ſometimes into a *Fiſtula*. A virulent *Bubo*, if not cured in Time, and the Matter which occaſions it becoming acrious, is often followed by dangerous Symptoms. The peſtilential *Bubo* is dangerous at all Times, becauſe it may cauſe a *Gangrene*, a *Caries*, or Death it ſelf. But there is no more Danger in a ſimple *Bubo*, than in thoſe *Bubo's* which are occaſion'd by Ulcers, or external Wounds.

A *Bubo* which ſucceeds a malignant Fever, or the Plague, proves always mortal, whether it makes its Appearance, under the Arm-pits, in the Groin, or in the Glands of the Neck. In People of a tender Conſtitution, a *Bubo* is much more dangerous than robuſt and ſtrong Bodies: And more dangerous alſo in the hot, than in a moderate Seaſon. In peſtilential *Bubo's*, the internal as well as external Remedies are to be given without Delay. A *Bubo* which appears in the Groin on a Sudden or at once, which is red and hard, and pointed, is accounted Salutiferous; as on the Contrary, when there is great Want of Strength, if the Patient be inclined to ſwooning, vomits up both his Aliment and Phyſick; if the Extremities of the Body are cold, and burn within like a hot Furnace; if there be a plentiful Evacuation of Excrements, which are either black or livid; if the Urine be inclining to black, and of an ill Scent; if in the Face there appear the Marks of a dying Perſon: All

theſe

theſe muſt be look'd upon as the certain Forerunners of approaching Death.

Thoſe *Bubo's* which ariſe on the Neck, at the Ears, and which are accompanied with great Difficulty of Breathing and exceſſive Pains in the Throat, are likewiſe not without Danger. Such *Bubo's* as are incircled with a Kind of Rainbow, and appear blackiſh, are alſo the Forerunners of approaching Death. It is a bad Sign when a *Bubo* diſappears on a ſudden, and if after you have apply'd a Veſicatory to it, and left it upon the Part for ſix or eight Hours, there is no Appearance of a Bliſter, or of any Humidity iſſuing from thence. A *Bubo* in the Neck is more dangerous than one in the Groin, becauſe the Patient is in Danger of being ſuffocated: If in any of thoſe Places where the *Bubo's* moſt commonly make their Appearances, there ariſes a Tumour, call'd an *Anthrax* or *Carbuncle*; this muſt alſo be look'd upon as a bad Sign. The *Bubo's* terminate like Tumours, by Reſolution, by Suppuration, by Induration, and by Corruption: And as in all Tumours, the Reſolution and Suppuration are good Signs, ſo the Induration and Corruption are ill Preſages.

The *Carbuncle*, call'd by the *Greeks*, *Anthrax*, happens indifferently in all Parts of the Body; it is a red Tumour, and as fiery as a *Carbuncle* or flaming *Coal*. from whence the *French* have given it the Name of *Charbon*: It ſometimes makes its Appearance in the Plague, tho' it is very often alſo obſerv'd without any preceding peſtilential Diſeaſe, and differs from the *Bubo*, in that this always ſeizes upon the tendinous Parts, whereas the *Bubo* fixes it ſelf in the *Glandules*.

Its Cauſe is very near the ſame with that of a *Bubo*, excepting that the Matter from which it is generated is ſomewhat more acrid and fiery, the *Carbuncle* always owing its Origine to the moſt maſſy, acrid and ſharp-edg'd Particles of the Blood, which corrode and tear aſunder the Parts in the Nature of *Aquafortis* or any potential Cautery, and thereby produce cancerous and corroding Ulcers. The *Carbuncle*, according to *Etmuller*, makes its firſt Appearance moſt commonly by an Excoriation; you may obſerve a large *Puſtule* or Pimple ariſe upon the Part, or a great many ſmall Puſtules gether, each of the Bigneſs of a Grain Millet, which ſoon after make one la hard Tumour, incircled with theſe ſm Puſtules, and in the Center or Middle th appears a corroding ſharp Ulcer, which tentimes eats into the adjacent Parts: A after the Cure of the *Carbuncle*, there alw remains a large *Cicatrix* or Scar, occaſio by the Loſs of Subſtance.

An *Anthrax* is ſometimes attended or f low'd by a *Gangrene*: There are alſo ſo *Carbuncles* which don't make their firſt A pearance with Puſtules, but with an Ul cover'd with a black Cruſt, not unlike Burning made by a hot Iron. This Inc ſtation is ſometimes inclining to Bla ſometimes of an Aſh-colour; and the C *buncle* is ſurrounded by a red Circle, wh is exceſſive painful. After the Cruſt f off, you don't meet always with a *San* but rather with a ſpongy Fleſh, which parating it ſelf from the ſound Part, lea a deep Ulcer behind it. The Sympto which moſt commonly attend the *Carbunc* are a burning Fever, exceſſive Pain, want Appetite, or rather an Averſion to Fo Vomiting, Palpitation of the Heart, Swoo ing, a Delirium, Convulſions, and burni Heat in the Intrails.

Whenever a fiery red *Carbuncle* chan and diſappears on a ſudden, you may g over your Patient for loſt: Thoſe *Carbunc* that make their Appearance after a peſtile tial Fever under the Arm-pits, or in t Groins, and are black or livid, are a ſcarce curable; but if come before a Fev they are not ſo hard to be cured. The ſm red *Carbuncles* not accompany'd by any ot Accident, admit alſo of an eaſy Cure. B generally ſpeaking, all the *Carbuncles* oug to be look'd upon as mortal, or at leaſt very dangerous.

Thoſe *Carbuncles* that appear in the me branous and nervous Parts, cauſe alm inſupportable Pains, and continue for long Time: Some of the *Carbuncles* w come to a Suppuration, and others will ver ſuppurate at all: Some of them ma their Appearance with, and others witho a Fever. But the *Carbuncles* which ſe upon any of the internal Parts, are mo

more dangerous than those on the External.

The *Carbuncles* that appear in the Groin, under the Arm-pits, or near the noble Parts, are exceeding dangerous, as are likewise those which are black, because they foretel a Mortification. The *Carbuncles* of a livid and yellow Colour, are also not without Danger: The fewer there are of the *Carbuncles*, the less the Danger, and the biggest are always more dangerous than the small ones; but when these *Carbuncles* disappear at once, it is a fatal Sign. Those *Carbuncles* that appear before a pestilential Fever, are not near so dangerous as those that come after it. A *Carbuncle* that is accompany'd with a *Bubo* is look'd upon as mortal, and so is that which produces a Hollowness.

Of the Phygeton, *the* Phymosis, *and the* Furuncle.

A *Phygeton* is a Red inflam'd small Tumour, or rather an *Erysipelatous* Tumour of the cutaneous Glands, which does not come to a Suppuration, attended with a burning Heat, and pricking Pain, caused by the Acrimony of the *Lympha*, which is stop'd in the Glandules of the Skin. This may be discover'd by its Appearance like an *Erysipelatous* Tumour attended with Pains, Tension, Heat and Induration: Sometimes also it is accompany'd with a Fever, Thirst, and want of Rest; in the beginning there is a Pulsation, the Patient feels a Heaviness in the Part with a burning Heat; it is Red, and inflam'd, the Patient is troubled with Shiverings, and the Tumour seldom comes to a Suppuration.

A *Phygeton* is very difficult to be cured, by reason of the Glandules; it being a general and unquestionable Rule, That all the Tumours of the Glands are much more difficult to be cured than those of the muscular and fleshy Parts.

A *Phymosis* is a small Tumour in the Glands also, not differing from the *Phygeton*, but that it easily comes to a Suppuration, and has its Origine from a Fermentation of the nutritious Juice with an acid *Lympha*, the Swelling is not so big, or painful, neither is the Heat and Redness so much as in the former. It frequently appears in Children, and is much easier to be cured in young People than old; but this to me requires a long Time before it will come to Suppuration.

The *Furuncle* or Boil, is a small Tumour attended with Heat, Redness and Pain, and makes its Appearance sometimes in one Part, sometimes in another. This Tumour has its Rise from an acid coagulated Blood, and a gross thick Chyle, because in these Tumours, the alkalious Salts are not sufficiently volatiliz'd, because the Blood superabounds in Acids: Whence it is, that the volatile Salts and Oleaginous Parts as well as the Spirits, for the necessary Support of Life, are not separated but with much Difficulty; and thus the Blood wanting a sufficient Supply, the volatile alkalious Salts, and spirituous sulphureous Particles becomes thick and gross, and being entangled in the musculous Parts, does there produce this Tumour.

The *Furuncle* appears in a hard and very red Swelling, attended with a burning Heat: In the Beginning the Patient often feels a Shivering and Fever; and when the Tumour approaches to a Suppuration, it proves very troublesome, being seiz'd with a violent Pulsation, Heat and Inflammation, which spread themselves far about the affected Part. This is not always of the same Bulk, being sometimes of the Bigness of an Egg, but at other Times much smaller: When one is going off, another appears sometimes in its Place, so that they sometimes continue several Months together, the Matter which issues from it being very thick like a Jelly mix'd with Blood: Sometimes this Tumour opens it self with several small Apertures or Holes, from whence issues forth a clear and limpid Liquor, and then the Hardness goes off: Sometimes the Matter is brought to a second Suppuration, and then there appear large hard Pieces within, which are very difficult to be drawn out.

The Matter which Causes the *Furuncle* being very viscous, is one of the Reasons why it comes so slowly to a Suppuration; for the *Sanies* it self contain'd in the *Furuncle* being very thick, it requires a considera-

ble Time to ſubtilize it, and by Attenuation to render it fit for Concoction; Suppuration being nothing in it ſelf but a Fermentation of the extravaſated Juices, which are detained or ſtop'd in a certain Part. Tho' there be no great Danger in this Tumour, it is obſervable, that ſuch Infants as are affected with this, grow dry and meager, and are oftentimes afflicted with a Difficulty of Breathing; ſometimes it happens that this ſmall Tumour is ſucceeded by an Ulcer, which is very hard to be cured, eſpecially if its Aperture be round and very deep; and in hot and moiſt Seaſons, which are apt to ferment the Humours, this Tumour becomes Epidemical. In Scorbutick and grown Perſons it is much more difficult to be cured than in Children.

Of the Ecchymoſis.

AN *Ecchymoſis* is a Concretion of the Blood under the Skin, which has been extravaſated out of its Veſſels that ſuffer'd a Diſruption only from ſome Blow or Fall. To give you a true *Idea* concerning the Formation of an *Ecchymoſis*, ſays a modern Author, let us ſuppoſe ſome very heavy Thing to fall or rub violently againſt our Body: 'Tis certain, that the Veſſels being compreſs'd by the Force of the Blow, do approach cloſe to one another, ſo that thereby the Blood iſſues out from the Orifices at the Extremities of theſe Veſſels.

By this Compreſſion, the Series and Texture of the Particles of the Blood is alter'd, and the *Materia ſubtilis* meeting with a Check in its Paſſage introduces a confus'd Agitation in the more ſubtile Parts of the Blood, to wit, in the volatile alkalious, as well as the more ſubtile Particles of the Phlegm; upon which the groſſer Particles of the Blood, as the Acids, the ſulphureous and fix'd Alkalies, uniting or being entangled together, are ſtop'd or retain'd of Courſe in the Part.

The Signs of an *Ecchymoſis*, are a ſoft livid Tumour, which is ſometimes quite without Pain, and ſometimes only a little painful; but at other Times, it is attended with an Inflammation, Heat and Redneſs. The livid Colour, that is obſervable in an *Ecchymoſis*, is occaſion'd by the coagulated Blood, and ſometimes it is turn'd into grumous Subſtance, becauſe it becom Acid. A ſlight *Ecchymoſis* is free from a Danger; it only ſpoils the Skin, where produces a livid Colour. In caſe the co gulated Blood is only in a ſmall Quantit it either is diſpers'd inſenſibly, or el comes to a Suppuration; but ſometimes th Part will turn *Sphacelous* and Gangrene, b reaſon of the violent Compreſſion of th Part.

A conſiderable *Ecchymoſis* ſeldom goes o without a Suppuration, becauſe of the grea Quantity of coagulated Blood, which is no eaſily diſſolv'd. It is further remarkable that an *Ecchymoſis*, and a Contuſion on th Leg and Foot, are difficult to be cured, eſpe cially in ſcorbutick Perſons, and ſuch a labour under an ill Habit of Body.

Of the Eryſipelas, *and the* Herpes *or* Serpigo.

THE *Eryſipelas* or St. *Anthony's-Fire*, is a Tumour which ſtretches it ſelf upon the Skin only, but is red as Fire, and expands moſt prodigiouſly both in Length and Breadth, being accompany'd with an exceſſive burning Heat, and pricking Pain, ſometimes alſo with the Head-ach and a Fever; if you preſs it with your Finger it leaves a white Mark, which turns red again in an Inſtant. The Heat proceeds from the Fermentation, and the pricking Pain from the Acids which prick the nervous Fibres: The Redneſs is owing to the Blood which is ſtop'd in the Capillary Branches, the Extremities of which terminate in the *Cuticula*. The Head-ach is occaſion'd by the ſame Acids, which irritate the Membranes of the Brain; and the Fever owes its Riſe to the Mixture of the volatile Acids and Alkalies.

The Tumour it ſelf is not altogether ſo ſenſible in the *Eryſipelas*, by reaſon that the Matter which produces it is Volatile, and in a ſmall Quantity, which is the Reaſon alſo why in this Diſeaſe the Heat and Tenſion are not ſo exceſſive as in the *Phlegmon*. The Cauſe of the *Eryſipelas* muſt not be look'd for in the Bile, but rather attributed to a ſubtile volatile Acid, which ariſing into

o a feveriſh Efferveſcency, with the vola-ile Salt of the ſanguineous Maſs, expands t ſelf in a certain Space of the Skin, and by ntroducing a Coagulation in the Blood in he interior Veſſels, and diſpoſes it to a otal Concretion, which is the true Cauſe hy the *Eryſipelas* does rather ſeize the Nerves and Blood-Veſſels at once, than the anguineous Parts alone.

An *Eryſipelas* in the external Parts is not ery difficult to be cured; and it is obſer-able, that when the *Eryſipelas* will not ad-mit of a Cure, it degenerates moſt com-monly into an Ulcer, and that an *Eryſipelas* hat ſucceeds a Fracture, or occupies thoſe Parts where the Bone is laid open, are like-wiſe very hard to cure. If an *Eryſipelas* eizes upon the Head and Face, it is exceed-ng dangerous, as well as when it happens upon the internal Parts; as the Liver, the nteſtines, the Womb; and in ſhort, upon ny other of the *Viſcera*. However, it is in effect very ſeldom mortal: Nevertheleſs, here are not wanting Inſtances to ſhow hat Perſons have died of this Diſeaſe; but his happens commonly by ill Management, viz. the prepoſterous Application of cold nd repercutient Applications. When after ſlender Excoriation, the *Cuticula* comes off n Scales, and the Skin regains its natural Colour, this is one of the beſt Signs that an be hop'd for the Patient, it being a cer-ain Token that the *Eryſipelas* is in a fair Way of being diſpers'd by inſenſible Perſpi-ation; on the Contrary, if the *Eryſipelas* trikes inwards, from the Outſide to the in-ernal Parts, it preſages nothing but Death, ccording to *Hippocrates*.

The *Herpes* or *Serpigo*, is nothing elſe but ome ſmall Puſtules, which paſs into an Exulceration: There are two Sorts of them, ne of which is call'd the *Miliaris*, and the ther the *Corroſive*. In the Firſt, there ap-ear ſmall Puſtules on the Skin, of the Big-neſs of a Grain of *Millet*, which renders the kin rough and unequal: In the corro-ive *Herpes*, there are ulcerated Puſtules which extend themſelves upon the Skin, nd leave a Hollowneſs behind them. This owes its Origine to a Diſunion of the ſe-ous, oleaginous and volatile Particles of he Blood: In this Diſeaſe, the Veſſels of the Skin are corroded by the Humour that iſſues thence, which produces theſe ſmall Puſtules, that are deriv'd from a ſlight Corroſion of the *Glandulæ Miliares* of the Skin. This Diſeaſe is moſt frequent among Children. In the *Herpes*, call'd the *Miliaris*, the *Lympha* is more incraſſated and more viſcous, becauſe it is depriv'd of its vola-tile Parts. This is call'd the dry and ſqua-mous *Herpes*, becauſe it has more Scales.

A dry and *corroſive Herpes*, are encreas'd by an *acrious Lympha*, which ariſing to an Efferveſcency, produces an Excoriation, Pain and Heat: A moiſt one is ſooner to be cured than the Dry and Corroſive. 'Tis frequently obſerv'd, that after a *Herpes* of a malignant Nature is cured, it is ſucceeded by moſt pernicious Diſeaſes, as Apoplexy, Conſumption, and the like: In ſcorbutick Conſtitutions, theſe Ulcers very often alſo turn to a Malignity, which prove very ſtubborn and hard to be cured; becauſe the Blood of ſcorbutick Perſons, abounding moſt commonly with acid Salts, theſe cor-rode like *Aquafortis*.

Of the Oedematous and Scirrhous Tu-mours.

AN *Oedema*, is a ſoft and white Swelling or Tumour, without either Pain or Heat, which does not reſiſt the Touch, and appears moſt frequently on the Legs, but very ſeldom on the Arms. The Cauſe of this Tumour muſt be look'd for in the con-creted *Lympha*, ſtop'd in the Lymphatick Veſſels, or elſe coagulated without the *Tu-buli*, which being detained there; contracts an acid Acrimony, that renders it thick and viſcous like Jelly, in the ſame manner as may be obſerv'd in the Boiling of Harts-horn, or the like; into which, if you pour an Acid, it will turn it in an Inſtant into a white Jelly.

We told you that the *Oedema* is without Heat; the Reaſon is, becauſe the *Lympha* being thick and viſcous, the *Materia ſubtilis* meets here with a free Paſſage, every where without any Obſtacle. An *Oedematous* Tumour dates its Beginning oftentimes from a ſlow Diſeaſe, during which, the volatile

and oleaginous Part of the Blood is diſſipated in ſuch a Manner, that there remains nothing behind but a groſs diſpirited *Lympha*, which cannot circulate without much Difficulty, either by reaſon of its Coldneſs, which cloſes up the Pores, or congeals the Juices. Thus we ſee thoſe who have their Feet often ſtand in Water or cold Places, more ſubject to theſe *Oedematous* Tumours than other People. The Cauſe of this Tumour ariſes alſo very frequently from the conſtant Uſe of acid and viſcous Aliments, which producing a crude Chyle, and ſuch as is apt to thicken the *Lympha*, prove often the Occaſion of an *Oedematous* Tumour.

An *Oedema*, that makes its Appearance without any previous manifeſt Cauſe, is dangerous, and commonly proves the Forerunner of a long Diſeaſe. If in a conſumptive Body, or after an Hæmorrhage, the Feet are ſeiz'd with an *Oedematous* Tumour: It is a very bad Sign, which ſhows that the *Lympha* and the Blood are quite deſtitute of a volatile Salt. If an *Oedematous Tumour* happens to light upon a Perſon of a vigorous or good Conſtitution, there is no Danger; nevertheleſs, it will ſometimes continue for a long Time, it very ſeldom comes to a Suppuration, by reaſon of the Viſcoſity of the Matter that produces it. There are not wanting Inſtances that an *Oedema* has degenerated into a *Gangrene* which is owing to a Compreſſion made by the Matter upon the nutritious Juices. This happens ſometimes in dropſical Perſons.

The *Scirrhus* is a hard Tumour, reſiſting the Touch, immoveable without either Pain or Heat, which is generated gradually by little and little, and reſts not only in the Glandulous, but alſo the muſcular and fleſhy Parts, both externally and internally, as the *Viſcera*, *&c.* This Tumour, according to *Etmuller*, proceeds from a Coagulation of the pure Blood; for a *Scirrhous* will often ſucceed an Inflammation, if ill cured, manag'd eſpecially by Repercutients and Aſtringents; or elſe from the Chyle, which when crude and viſcous, and being diſpers'd together with the Blood or ſome other foreign Vehicle, is coagulated, and occaſions a hard Tumour; whence it is, that an *Oedematous* Tumour will ſometim degenerate into a *Scirrhus*.

The Swellings that happen ſo frequent in Womens Breaſts, may alſo not improperly be referr'd to this Head, by reaſon of th Milk, which is often turn'd in a Scirrhous Tumour. For the Blood and the viſcous Chyle being mix'd together, do coagulate as they paſs ſucceſſively thro' the Pore of the Parts, and more eſpecially thro thoſe of the *Viſcera*, there being ſtop'd or detain'd, they degenerate into Scirrhous Tumours, by Means of an Acid *contra Naturam*; which is there either in too great Quantity, or elſe too auſtere, or too much vitiated in ſome other Reſpect. The Signs of a true or legitimate *Scirrhus*, are Hardneſs and Indolency, which always accompany it as Pain or a livid Colour are Signs of a falſe or ſpurious *Scirrhus*, which in ſome Meaſure approaches to the Nature of a *Cancer*, *which ſhall be fully examined when we come to treat of the Glands and their Diſeaſes*; *and therefore ſhall paſs it by here*, and *proceed to* the *Itch*, the *Leproſy*, *&c.*

Of the Itch, Leproſy, Impetigo, &c.

THE *Itch* is call'd *Iſera*, by the *Greeks* and *Scabies*, by the *Latins*; becauſe it is rais'd in the Nature of Scales: It is diſtinguiſh'd in two Sorts, to wit, into a wet and dry *Itch*, both which produce remarkable Itching in the Skin. In the Beginning the Patient is troubled with a violent Itching, and takes Pleaſure in ſcratching himſelf; but ſoon after, this Pleaſure is far over-balanced by the *Pus* that enſues, and the Skin turns red, very hard wrinkled when the Itch begins to come to its Height. 'Tis an old Proverb, That Love and the *Itch* will diſcover themſelves, do what you will, becauſe it is impoſſible to forbear ſcratching where it itches.

When we are troubled with the *Itch*, it is much more in the Night than the Day time, becauſe the Heat of the Bed puts the ſaline Particles into a briſker Agitation and raiſes a more than ordinary Fermentation, which is attended with ſuch trouble ſom

me Symptoms, that it is next to an Impoſ-ibility to keep ones Fingers or Nails from ; ſometimes the Puſtules of the Itch are mall, ſometimes much larger, ſometimes ry, and othertimes moiſt: When they ome to a Suppuration they produce ſmall lcers, which are cover'd with a Kind of ruſt, that when dry, will come off like ales in Scratching.

The *Itch* proceeds from much the ſame auſe as the *Eryſipelas* or the *Herpes*: For in he *Itch*, the *Glandulæ Miliares* and *Lympha-ick Ducts* of the Skin, are corroded by the crid ſaline Particles, with this Difference ho', that the Glands and Ducts which are orn to Pieces by the Salts, are fretted much eeper in the Itch, than in the *Eryſipelas*. The Puſtules and ſmall Ulcers in the *Itch* re ſometimes dry, and ſometimes contain n acrid *Lympha*; and theſe Ulcers are lar-er or ſmaller, according to the different exture of the Skin, which is ſuch, as to e more lax in ſome Places, and more traight in others.

The *Itch* is very Infectious, becauſe, ac-ording to *Etmuller*, there is a perpetual Ex-alation of the acid volatile Particles, hich penetrating without the leaſt Obſta-le thro' the Pores of the Skin, produce a toppage of the Blood and *Lympha* in the mall Veſſels of the Skin. This Acid being ntangled within the Viſcoſity of the *Lym-ha*, and in the ſmall Ducts of the Skin, here by Conſequence it is diſabled to urſue its Courſe, it remains for ſome time nactive; but ſo ſoon as the Juices which ere coagulated by the Acid begin to be ut in Motion by the Heat of the Circum-mbient Air, and by the *Materia ſubtilis*, hich enters not only the Pores on the Sur-ace of the Skin, but alſo thoſe of the coa-ulated Juices, where its Motion is check'd y the acuminate ſaline Particles, which raw together or ſtraighten the Diameter of he ſmall *Tubuli* of the Skin; then this vola-ile Acid ſoon diſcovers it ſelf by an Itch-ng, and by theſe ſmall but acrid and cor-oding Puſtules, which produce an Exulce-ation in the Skin.

From what has been ſaid, it is manifeſt, hat the acid Particles which cauſe the *Itch*, re more ſubtiliz'd and exalted than thoſe that produce a *Furuncle*; becauſe the Acidi-ty of the *Itch* is ſoon communicated to others by Sweat, which does not happen to thoſe who are affected with a *Furuncle*. 'Tis no hard Task to explain how the Infection in the *Itch* is communicated to another Per-ſon, if we conſider, that the Sweat of an itchy Patient abounds in volatile acid Par-ticles, which are very apt to penetrate and inſinuate themſelves into every Part of the Body, from thence being carried with the Blood and the *Lympha* to the Heart, and in their Return thence, precipitate the *Lympha* in the Lymphatick Veſſels, and in the cuta-neous Glandules of the Skin; becauſe there is not any Part of our Body ſo properly adapted to the Reception of the foreign Ferment, as the ſame Veſſels and Glandules of the Skin, they being the ſame in the Structure and Configuration of their Parts with thoſe from whence the foreign Fer-ment had its Riſe, and was communicated to them.

The Itching is owing to certain fine and ſubtle Particles, which the Blood that paſſes thro' the Part puts in Agitation, in ſuch a Manner as to make them hit one againſt the other: But as theſe Particles are very ſmall, and not very ſolid, and the Impreſ-ſion they receive from the Blood but feeble, they give only a gentle Touch or Shock up-on the nervous Fibres, which produces that tickling Pain we call Itching. But that moſt ſevere and troubleſome Itching theſe People are ſubject to, in the Night-time ariſes from nothing elſe but the Heat of the Bed; for when we are cloſe cover'd, there is a free Perſpiration all over the Body; ſo that the Juices which are ſtop'd, or detain'd in ſome Part, are put into an extraordinary Fermentation, and conſequently theſe ſmall oblong and pointed Particles fixed in the Glandules of the Skin participate of, or have their Share in this extraordinary Agita-tion.

After the firſt Puſtules or Scabs are fallen off, others moſt commonly appear in their ſtead, becauſe when theſe Scabs are dry in us, they communicate Part of their Ferment to the Blood, which, after having per-form'd their Circulation in Conjunction with the Blood thro' the Body, are brought back

back again to the ſame Glandules, there they fix and produce new Puſtules. The other *Phænomena* of the *Itch* may be explain'd without much Difficulty: It is a Diſeaſe much more Troubleſome than Dangerous: However, when that Matter which produces the *Itch* is forced backward into the Maſs of Blood, it is ſometimes attended with moſt grievous Symptoms, as Palpitation of the Heart, Epilepſies, Apoplexies, Pains in the Cheſt, Suffocations, Defluxions, Convulſive Coughs, Looſeneſs, *&c.*

Sometimes the *Itch* proves a good Remedy to cleanſe the Blood of its Impurities, and then it is always favourable. When it ſeizes upon the Head, it is very hard to be cured: When it ſeizes upon many Parts at once, it is more dangerous. An *Itch* with great Scabs, and thoſe in vaſt Quantities which itch vehemently, as likewiſe when it breaks out into Ulcers on the Legs and Feet, 'tis difficult to be cured. A dry *Itch* does not admit of ſo ſpeedy a Cure as the moiſt or wet One; but in caſe it be neglected, it may eaſily degenerate into a *Leproſy.*

The Common *Leproſy*, according to *Etmuller*, is an univerſal Obſtruction of all the Glandules of the Skin, or ſometimes but of one Part of it: It makes tis Appearance with cruſty Scales or Scabs, and this ſcaby *Itch* is attended with moſt ſevere itching.

The *Elephantiaſis* is a Kind of a *Leproſy*, but more malignant than the former, becauſe the Salts which produce it, have acquired a higher Degree of Acrimony: It makes its Appearance with hard and cruſty Tubercles, or Scabs, with livid, nauſeous Spots and Exulcerations all over the Body. When the Patient is ſeized with the *Leproſy*, he feels in the Beginning a certain Heavineſs and Stupidity all over; he is Drowſy, Melancholy, Peeviſh, his Sleep is interrupted by frightful Dreams; and if he lies on his Back, he no ſooner falls aſleep but he is troubled with the *Incubus* or Night-mare, or elſe with ſome other ſoporoſe Affection.

Some of the leprous Perſons will riſe in their Sleep, and run from Place to Place; others are ſo ſalacious, that their Member is always erected, which Indiſpoſition call'd a *Priapiſm* or *Satyriaſis*; ſome oth Lepers are affected with Difficulty of R ſpiration; they have a ſtinking Breath, ſlender and uneven Pulſe, are very Thirſt but have little Appetite to their Mea their Bellies are hard; their Urine oft not unlike thoſe of the Four-leg'd Animal their Skin hard and rough; the Face a all the Reſt of the Body of a livid Colour they break Wind, almoſt every Mome upwards and downwards; for their A ment being ill digeſted, turns into a viſco Subſtance; which being rarify'd afterward into a flatulent Matter, and this finding n other Paſſage but the ſuperior and inferi Orifice, it opens its Way with Impetuoſi thro' theſe Parts.

As the Diſeaſe increaſes, the Symptom alſo grow worſe in Proportion; the No cloſes, ſwells, and becomes deformed which hinders Reſpiration: In the Fac and on the Forehead there appear man moveable Tubercles of a darken'd Colour but are not painful: The whole Face i bloated up, and almoſt cover'd with livi and blemiſh'd Spots, the Eye-lids ar ſwell'd, and the Inſides turn'd outward the Cheeks puff up, the Chin much bigger and the *Parotides* ſwell'd into a large Tu mour: They have a frightful Look or A pect, their Eyes are red, inclining to yel low, and roul in their Heads, the Hair o the Body falls off, and they are throughou a diſmal Spectacle to behold. When a *Le proſy* is come to its higheſt Pitch, there ar not wanting Inſtances, that the Finger and Toes, the Noſe, Ears, and Privy-Parts have been ſeen to drop off: The Nails alſo will fall from their Roots, the whol Body caſts a moſt nauſeous Scent; and in Concluſion, the poor miſerable Leper i quite conſumed and dry'd up by ſlow Degrees, and by the Continuance of a He ctick Fever.

The *Leproſy* is an Hereditary Evil, tranſ planted from the Father or Mother to the Children: It is communicated alſo by Con tact, as when you lye in the ſame Bed with a Leper, eat or drink with him, or make uſe of the ſame Linnen he has worn before. It is alſo eaſily communicated in the

e venereal Act, becauſe the *Semen* is apt penetrate into the capillary Branches, d the Glandules belonging to the *Penis* *Uterus*, whence being carry'd together ith the *Lympha* into the ſanguineous aſs, it communicates its Character to

The *Leproſy* owes its Riſe to the terre- ious, viſcous Particles mix'd with the rid, fix'd acid Salts which are in great bundance in the Blood of the Lepers, hich is thick and acid, wherewith they e eaſily brought into a Fermentation, as ing of a Heterogeneous Nature. By this rmentation, they are thruſt forward to e Surface of the Body, very near after the me Manner, as we ſee the *Tartar* and es of Wine caſt out to the Sides of the ask, according to the natural and proper lotion of Liquids, and of the *Materia ſub-is*, which cauſing an Effervescency in the ine, and meeting with theſe Parts in the iddle of the Liquor, chaſes them thence, order to take their Paſſage from the Cen- r to the Circumference, which is towards e Sides of the Cask, to which they are d, by Means of the Inequalities of their gures. In the ſame Manner all the fix'd d groſs Salts are in leprous Bodies, by the otion of the Blood, and that of Perſpi- tion, chas'd to the Surface of the Body, here penetrating by the Help of that ſlen- r Share of Motion that is left them, into e ſmall Capillary Veſſels, and the cuta- eous Glandules of the Skin, they are en- ngled within thoſe Glandules, without ing able to go any further thro' the Ex- etory Paſſages of the Skin, or to return ck thro' the Extremities of the Veins; ſo at theſe Salts encreaſing and multiplying little and little in theſe Glandules, they ſe a Coagulation in the *Lympha*, and reby a Tumefaction in the Glandules, d in the ſmall Veſſels of the Skin; all ich together produces theſe putrid Tu- cles and incurable Ulcers, which are to ſeen all over the Body of a Leper. In e a *Leproſy* be attended with all theſe mptoms that have been related before, re is no Hopes for a Cure; but if be not a confirm'd *Leproſy*, and there Youth and good Conſtitution in the Way, there are ſome Glimpſes of Hope for a Cure, but otherwiſe we may reſt ſatisfied it is incurable.

An *Impetigo*, is a Kind of *Itch*, accompany'd with flat and corroding Puſtules, which ariſe in the Nature of Scales; there are two Sorts of it, one which appears only with ſmall Puſtules, and the Second with broad and corroding Puſtules with great Itching. This Diſeaſe is not attended with ſuch pernicious Symptoms as the *Leproſy*, for the ſmall Ulcers which ſometimes will appear in the *Impetigo*, are without any Malignity; neither may theſe Ulcers be communicated to others by Way of Contagion, as thoſe of the *Leproſy* are, but have their Riſe from an ill Diſpoſition of the Blood and the other Juices, or from ſome Diſorder in the *Regimen*, or from the Remnants of ſome other Diſtempers which were not well cured, as from the Scurvy and the Pox. Neither do theſe Ulcers ſpread themſelves over the whole Body, like thoſe in the *Leproſy*, but ſeize only upon ſome certain Part, as the Arms, the Legs, the Thighs, or ſome other Parts.

Theſe Ulcers are produced by a *ſubtile Lympha*, coagulated by the Acid of the cutaneous Glands of the Skin; the moſt ſubtile Parts of this *Lympha* being diſpers'd or evaporated, what remains behind is incraſſated, dry'd up in Scales or Scabs which drop off one after another. If this *Lympha* happens to be ſo acrid as to corrode the capillary Veſſels, which carry the Blood to the Glands, as likewiſe to corrode the excretory Ducts of the Glandules, then much of the *Lympha* is extravaſated, which being indurated, is chang'd into a cruſty Subſtance.

The Spots call'd *Alphos* and *Leuce*, are ſmooth and not riſing above the Skin, but introduce a Deformity. The *Alphos* is of a white Colour, and ſo is the *Leuce*, but this laſt ſtarts out a little above the Skin. Theſe Spots make the Hairs fall off, inſtead of which, there come others that are downy and white: 'Tis farther obſervable, that when the *Leuce* is of an old ſtanding, it will not turn red when it is rubb'd; and if it be prick'd, no Blood follows, but only

only an *aqueous Sanies.* An acrious Salt which is detain'd in the cutaneous Glandules, and diſſolv'd in the *Lympha*, being apt to introduce an Alteration in the Texture of the Skin, the Spots or Puſtules appear of a white Colour; for the ſaline Particles which paſs thro' the Pores of the Skin, ſtop and gather under the *Cuticula*, which is more cloſe and compact, ſticking to the Surface and changing its Colour: And this is what produces the Spot call'd *Alphos.* But in caſe the Acrimony of the *Lympha* is ſuch as to corrode the ocular Glandules, the Hairs fall off, and this Spot is call'd *Leuce*, becauſe it is clearer than the former. The *Impetigo*, the *Alphos*, and the *Leuce* are leſs or more difficult to be cured, according as the Matter which occaſions them has acquired a higher or leſs Degree of Acrimony, and according as theſe Diſeaſes are complicated with others.

Of the Phlyctenes, *the* Hydroa, *the* Epinictides, *the* Terminthus, *the* Eſſera, *the* Phyſadracia *and the* Ficus.

THE *Phlyctenes*, are certain ſmall Puſtules which ſpoil the Skin, and produce both Pain and Itching: Theſe Puſtules or Veſicles contain an acrious and acid *Lympha*, which corrode the lymphatick Veſſels of the Skin, and thereby raiſes the *Cuticula* into ſmall Bladders, from whence iſſues a white and yellowiſh Seroſity. Tho' the *Phlyctenes* are not dangerous, they are ſure to produce Tetters, and corroding Ulcers, if they are not manag'd as they ought to be.

The *Hydroa*, are ſmall red Puſtules which ariſe from the Acrimony of the Sweat, and are troubleſome only by their Itching.

The *Epinictides*, are ſmall Puſtules of about the Bigneſs of a Bean or Lupin; they are livid, inclining to a Black, and ſometimes whitiſh, accompanied with Inflammation and Pain. They owe their Riſe to an Obſtruction of the Glands and the ſmall Ducts of the Skin; theſe ſmall Puſtules ariſe in the Night-times, and are always attended with an exceſſive Pain becauſe the ſaline Particles irritate the nervous Fibres. The livid Colour of the Puſtules is owing to nothing elſe but the Coagulation of the Blood, and of the other Juices: They are not dangerous but only ſpoil the Skin by their ſmall Puſtules, which go into an Exulceration.

The *Terminthus*, are ſmall round Tubercles, black and green, not unlike the eculcerated *Herpes*, and happen frequently to break out upon the Lips of Scorbutick and Pocky Perſons; it is caus'd by the *Lympha*, which being depriv'd of its aqueous and volatile Parts, is become acrid and corroſive.

The *Eſſera*, are ſmall ſcaly or ſcabby Puſtules, not unlike thoſe to be obſerv'd in the Itch, excepting that they are rais'd ſomewhat higher. This Diſeaſe is caus'd by a viſcous *Lympha*. It is a general Diſtemper among thoſe that work in the Mines.

The *Phyſadracia*, are ſmall Puſtules which appear moſt commonly on the Head, and are caus'd by an acrid ſubtile *Lympha* which corroding the ſmall Veſſels of the Skin, and being extravaſated, enter the Skin and the *Cuticula*. It is ſoon cured and returns as ſoon.

The *Ficus*, is a ſmall Tumour which appears in ſeveral Parts; as on the Eye, the Eye-lids, the Chin, the *Anus*, at the Fingers Ends, and within the *Vagina*. This ſmall Excreſcence is call'd *Ficus*; it hangs on the Part like a Fig. Its Riſe is owing to the groſſer Parts of the nutritious Juice; which being turn'd viſcous and acid, are entangled and detain'd in the ſmall Glandules and Ducts of the Skin. This Diſeaſe is very difficult to be cured by any external Applications or Remedies, the moſt common and beſt Way is to take them off by Amputation.

Of Encyſted Tumours, of the Atheroma, *the* Meliceris, *the* Steatoma, *and the* Emphyſemis.

WHen a certain Humour is enclos'd in its proper Membrane, and goes into a Tumour, theſe are call'd Encyſted Tumours, which have receiv'd their peculiar Denominations according to the different Humours which produce them. Thus when the Humour contain'd in the Membranes or Bags is like Honey, 'tis call'd *Meliceris*; when like Broth or Gravy, it is ſtil'd *Atheroma*; and when of the Conſiſtency of Suet or Greaſe, *Steatoma*.

Since all the Encyſted Tumours, ſays *Etmuller*, owe their Origine to nothing but a Dilatation of the Lymphatick Veſſels, the Membrane which encloſes it is nothing elſe but a Dilatation of ſome Lymphatick; for in the ſame Manner as an Aneuriſm is nothing but the Dilatation of an Artery, and *Varix* of a Vein, the *Cyſtis* is nothing elſe but the Dilatation of ſome Lymphatick, wherein the *Lympha* is coagulated, and chang'd into a Matter of different Sorts. This Dilatation ariſes from diverſe Cauſes, either from the Obſtruction of ſome Gland which preſſes upon the Lymphatick Veſſel that is adjacent to it, which produces a Dilatation, becauſe the Liquor is ſhort in its Courſe; or elſe from ſome Blow or Fall, which cauſes either a Diſruption or Weakneſs of the Parts; for the *Lympha* finding its Veſſel either torn aſunder, or elſe much ſtretch'd, it will extravaſate or dilate it ſelf, becauſe it meets with very little Reſiſtance.

When the Encyſted Tumours contain a greater Quantity of fix'd Salt mix'd with the *Lympha*, it will produce a thickiſh Matter, like Jelly; for Experience teaches us, that the fix'd Salts will thicken Liquors, but not ſo as to harden them as the Acids do, eſpecially if it be found in any conſiderable Quantity. In caſe the *Lympha* is thick and viſcous, as intermix'd with Acids, the Mixture produced thereby is like Suet: But as for the *Meliceris*, it owes its Form to the oleaginous, ſpirituous and ſulphureous Parts, which gives it the Conſiſtency of Honey.

Theſe Tumours are very hard to be diſſolv'd, by reaſon of the Viſcoſity of the *Lympha*, and though in themſelves they are never dangerous, they muſt nevertheleſs not be neglected, becauſe they are ſometimes follow'd by Ulcers, Excreſcencies, and other Deformities.

The *Emphyſemis* is a flatulent Tumour, enclos'd in its peculiar *Cyſtis* or Bag, which gives Way to the Fingers, as not being ſo hard as an *Oedema*. It comes from an Obſtruction of the Pores, and the excretory Ducts of the Skin, by which inſenſible Perſpiration is impeded, and conſequently the Vapours which are ſtop'd in their Paſſage gather either under the Skin, or elſe between the Muſcles, and there produce a flatulent Tumour, by the Name of an *Emphyſemis*, which requires either a longer or a ſhorter Time to be cured in, according to the Difference of the Part where it is ſeated. Theſe Sorts of Tumours muſt never be open'd, but you muſt endeavour to diſperſe them.

Of Warts, Corns, and Fungous Excreſcencies.

WArts are nothing elſe but fleſhy Excreſcencies, which bring a Deformity upon the Skin. They are deriv'd from a ſharp nutritious Juice, which by its Acrimony corroding the Lymphatick Veſſels of the Skin, the Juices extravaſate, and are coagulated by the Acids into a ſpongy ſoft Subſtance. When theſe make their Appearance upon the Genital Parts, they are always produc'd by ſome Venereal Infection, and are much more difficult to cure than common Warts. In caſe a Wart has taken Root in a Tendon, it is very dangerous and difficult to be eradicated, without expoſing the Patient to the Danger of Inflammations, Convulſions, and exceſſive Pains. *Corns* are meer Excreſcencies, that ariſe moſt commonly upon the Bones, caus'd by Contuſions and Bruiſes, chiefly fed by the nutritious Juice from the Exſudation of the Part. They are not ſo eaſily cur'd as ſome pretend, therefore the beſt Way is to cut them.

The *Fungus* is a ſoft Excreſcency of the Fleſh, which moſt commonly comes about the Joints, from the too great Dilatation, or elſe by a Diſruption of the Membranes,

or a violent Relaxation of the tendinous Fibres, which give another Opportunity to the nutritious Juice to extravasate in a considerable Quantity, when being coagulated into an irregular Contexture, it produces that soft fleshy Excrescence call'd a *Fungus*. These fungous Excrescencies arise more frequently upon the Membranes of the Brain than in any other Parts, as may be observ'd in the Wounds of the Skull, especially if particular Care has not been taken to keep the Air out.

A *Fungus* which arises upon the Joints, will sometimes continue there for sever Years, and impair their Motion. Som times they are attended with Pain: And is observable, that by their long Cont nuance, and the Compression they make u on the Nerves, they will impair both t Motion and Sensation of the affected Pa 'Tis further observable also, that these fu gous Excrescencies will oftentimes dege rate into *cancerous* Tumours, *viz.* in ca the nutritious Juice contracts a corrosi Acrimony.

Some Observations concerning Tumours and Abscesses with their Cures. Taken out of Monsieur Le Clerk *Physician in Ordinary to the* French *King.*

HE defines a Tumour to be a Rising or Swelling caus'd in some Part of the Body either by Fluxion or Congestion. A Tumour caus'd by Fluxion, is that which is rais'd at once, in a very small Space of Time; and a Tumour by Congestion, that which is produc'd by Degrees, and almost insensibly.

The Difference of Tumours he takes first from the Diversity of the natural Humours, according to which they are either Simple, Mix'd, or Alter'd. Thus the *Phlegmon* and *Erysipela's* are Simple Tumours, the first being occasion'd by the Blood, and the latter by Choler; whereas the *Erysipelatous Phlegmon*, and the *Phlegmonous Erysipela's*, are Mix'd Tumours, because they proceed from an Intermixture of Blood and Choler: But the *Meliceris* is an Alter'd Tumour, as being a Composition of many Humours, that cannot be distinguish'd from each other, by reason of their too great Alteration.

The Second Difference is from the Figure or Resemblance to some other Thing, as the *Carbuncle* from its Likeness to a burning Coal, and the *Talpa* to a Mole. The Third from the Place where they arise, as the Opthalmy in the Eyes, and the Quinsey in the Throat. The Fourth from the Distemp to which they are incident, as Venerea Pestilential *Bubo's*, *&c.* The Fifth from ce tain Quantities peculiar to some, as E cysted Tumours, which are contain'd wit in their proper *Cysta* or Membrane.

He further distinguishes the Tumours i to Natural, Encysted, Critical, and Mali nant. A Natural Tumour he calls th which is made of the Blood, Choler, Phleg and Melancholy, or else of several of the mix'd together. Thus the *Phlegmon* is pr duc'd by Blood, the *Erysipela's* by Chol the *Oedema* by Phlegm, and the *Scirrhus* Melancholy; but the *Phlegmonous Oedem* or the *Oedematous Phlegmon*, are by the M ture of diverse of these Humours.

An Encysted Tumour is where the Matt thereof is enclos'd in a membranous Bag, the King's-Evil, *&c.* A Critical Tumo appears on a sudden, and terminates an acu Disease either with good or bad Success. Critical Tumour is always attended wi pernicious and uncommon Symptoms, a proves very dangerous in its Consequenc as the Pestileutial Carbuncle. An Impostu or Abscess is a gross Tumour, that may suppurated or dissolv'd; but Pustules a

mall Tumours which frequently do not come to a Suppuration. The Difference betwixt a Tumour and an Abſceſs is, that every Tumour is not an Impoſtume or Abſceſs, but there is no Abſceſs but what is a Tumour.

There are Three general Cauſes of Tumours, *viz.* the Primitive, the Antecedent, and the Conjunct. The Primitive Cauſe, ſays he, is the ſame that occaſions the Tumour, as a Fall or Blow; the Antecedent is that which furniſhes the Matter, as the Maſs of Blood that ſupplies the *Phlegmon*; and the Conjunct Cauſe is the overflowing Blood or Matter which immediately forms the Tumour. The Firſt of theſe Three may be prevented by avoiding Falls, Blows, *&c.* the Second by diminiſhing and qualifying the Blood by Phlebotomy; and the Third by diſperſing it, either by diſſolving, or diſcharging the Matter by Suppuration; becauſe all the Tumours are terminated, either by diſſolving them, or elſe by Suppuration.

The Way of curing them by diſſolving ought always to be attempted as far as poſſible; but when they are either Critical, or of a Malignant Nature, Suppuration muſt be procured by all Ways and Means, even by opening, which ſometimes muſt be done without waiting for their Maturity. In the opening of Tumours, great Precaution muſt be taken not to cut the Fibres of the Muſcles, and in great Abſceſſes not to diſcharge the corrupt Matter all at once; though this Inciſion cannot always be made longitudinally, and according to the direct Courſe of the Fibres, but of Neceſſity muſt be made Circular in large Impoſtumations, or when a Sinus or membranous Vehicle is to be extirpated or diſcharg'd.

The Matter that iſſues from the ſuppurated Tumours he diſtinguiſhes into Four Sorts: A *Pus*, or thick white Matter, like Milk; an *Ichor*, or a *Pus* of diverſe Colours; *Sanies*, or watery Matter that riſeth up in Ulcers, like the Sap in Trees; and the *Virus*, or whitiſh, yellowiſh, greeniſh and fœtid Matter, which iſſueth out of Ulcers, and is of a corroſive malignant Quality.

Certain particular Obſervations, taken from the ſame Author.

FIrſt of the *Phlegmon*. It is a red Tumour, occaſion'd by the Blood diffus'd in ſome Part, accompany'd with Extenſion, Pain, Heat and Pulſation. The *Phlegmon* is nevertheleſs not always compos'd of pure Blood, but ſometimes partakes of Choler, Phlegm or Melancholy, and then is call'd an *Eryſipelatous*, *Oedematous* or *Scirrhous Phlegmon*.

Aneuriſms and *Varices*, though made of Blood, are not *Phlegmons*, becauſe in theſe the Blood is neither extravaſated, nor accompany'd with Inflammation, no more than the *Ecchymoſis* or Contuſions, which, though they conſiſt of extravaſated Blood, are not attended with Pain, Heat, Pulſation and Inflammation, unleſs they be neglected. The Remedies to be made uſe of in the Cure of a *Phlegmon* are either General or Particular. The General are Blood letting in the Beginning and Increaſe, a proper Diet, and ſometimes Purgatives: The Particular are Fomentations, Cataplaſms and Plaiſters, ſuch as either diſperſe the Tumour, or elſe bring it to a Suppuration.

Upon the firſt appearing of the Tumour, Reſolvents and Anodines are moſt proficuous, as *Chervil* boil'd in Whey with a little Saffron, to waſh the Tumour, or to dip Linen Cloths therein to be apply'd with the Chervil, and often renew them; or elſe bath the Tumour with the Urine of a healthful Perſon, wherein is boil'd an Ounce of Sulphur for each Glaſs. The ſame Author preſcribes Frogs Spawn, mix'd with Lime-Water and Soap, and Oak Leaves and Plantane beaten ſmall.

In the Increaſe of the Tumour and Pain, he preſcribes a Cataplaſm of Elder Leaves, Dwarf Elder, Mallows, Violet Leaves, Camomil, Melilot, with the Addition of ſome beaten Linſeed, all boil'd in Whey, and brought to the Conſiſtence of a Pultiſe, adding to every Pint the Yolk of an Egg, twenty Grains of Saffron, four Ounces of Honey, and ſome Crums of white Bread: Or elſe the Yolk of an Egg, Saffron and Honey may be mix'd together, and apply'd in Form of a Cataplaſm, to be renewed

twice in 24 Hours. In caſe the Tumour muſt be brought to Suppuration, it may be effected by Cataplaſms compos'd of Garlick and white Lilly Roots roaſted, Milk and *Baſilicon*, an Ounce of Soap, Sorrel boil'd in freſh Butter, and a little Yeaſt; or the Plaiſter of *Diaſulphuris*, either alone, or mix'd with *Diachylon* and *Baſilicon*.

After the Suppuration, the Ulcer muſt be ply'd with *Empl. Diaſulphuris* or *Diachylon*, and at laſt that of *Diapalma* and Ceruſs. In caſe there be a Diſpoſition to a Gangrene, diſſolve a Dram of white Vitriol, and the ſame Quantity of *Sal* Armoniack, in an Ounce of the beſt Vinegar, and bath the Part with it, or elſe with the Tincture of Myrrh and Aloes, with a little *Egyptiacum*; and if there be any Putrefaction, apply a Digeſtive of Turpentine, the Yolk of an Egg, and ſome Honey mix'd with a little Spirit of Wine, *&c.* The Tumours or Impoſtumes partaking of a *Phlegmon* are, the *Bubo*, *Carbuncle*, *Anthrax*, *Furuncle*, *Phyma*, *Phygeton*, *Panaritium* or *Paronychia*, *Burn*, *Gangrene*, and *Chilblain*. A *Bubo*, ſays our Author, is a Tumour ariſing in the Groin, attended with Heat, Pain, Hardneſs, and ſometimes a Fever. A *Carbuncle* is a hard red Tumour, always attended with a Fever, cover'd with a black Scab, which falls off at the Suppuration, and then leaves a deep Ulcer behind; ſometimes it will not come to a Suppuration. An *Anthrax* does not differ from a *Carbuncle* but only in this, that the latter appears only in the glandulous Parts, whereas the former breaks out in every Part of the Body. A *Furuncle* is a Kind of benign *Carbuncle*, a *Phygeton* a ſmall red inflam'd Protuberancy in the Miliary Glandules, accompany'd with Pain, but without Suppuration; and the *Phyma* is the ſame with the *Phygeton*, only that it ſuppurates.

All theſe ſeveral Sorts of *Phlegmous* Tumours and Impoſtumes are cured by Pultiſes, Plaiſters, either Anodine, Emollient, Reſolutive, or Suppurative, proportion'd according to the *Phlegmon*.

A *Gangrene* or *Sphacelus* ſignifies the ſame Thing; nevertheleſs they are diſtinguiſh'd in this, that the former is only a Beginning of a Mortification, occaſion'd by the Spirits being intercepted, whereas the latter is a total or abſolute Mortification, caus'd by the total Privation of the Spirits and natu Heat. The Cauſes of a *Gangrene* in gene are all ſuch Things as hinder the Spirits a natural Heat from performing their Functio in a Part, as too ſtraight Ligatures, aſtri gent or reſolvent Remedies prepoſterou apply'd in violent Inflammations, exceſſ Hemorrhages, old Age, when the Spirits quite exhauſted, the Biting of mad Do Extremity of Cold, *&c.*

A *Gangrene* may be diſcover'd by the vid Colour of the Skin, which ſepara from the carnous Part by a Softneſs, Co neſs and Want of Senſation in the Pa ſometimes alſo by a Dryneſs, Blackneſs, a the Exhalation of a cadaverous Scent, and *Sanies* iſſuing forth after Inciſion or Scarifi tion made therein. If a *Gangrene* be atte ded with cold Sweats, Fainting, *Syncop* and *Deliriums*, theſe muſt be look'd up as the Forerunners of approaching Dea When a *Gangrene* happens in the Bones, is call'd a *Caries*, and diſcovers it ſelf fi of all by a black Colour that appears in t adjacent Fleſh, and a fœtid Scent in the *nies*, that comes away with inſupportab fix'd and continual Pains thereabouts, befo the Impoſtume and Ulcer make their A pearance; but after the Ulcer is made, Roughneſs may be diſcover'd in the Bone.

In the Cure of a *Gangrene* there are tw Indications, *viz.* to take away the mortify Parts, and to reſtore the natural Heat. T firſt of theſe is moſt effectually anſwer'd eradicating what is corrupted by the He of the Knife and proper Remedies: As f Inſtance, by bathing the Part, in the fi Diſpoſition towards a *Gangrene*, with go Vinegar, in which are infus'd white Vitri and *Sal* Armoniack, a Dram of each to Ounce of Vinegar, in which you may a ſoak Compreſſes to be apply'd to the affect Part; or elſe you may make uſe of Lim Water, a Pint, in which is diſſolv'd half Dram of corroſive Sublimate. If the D eaſe requires more efficacious Remedies, t Tincture of Myrrh and Aloes, in whi has been infus'd ſome *Unguentum Egyptiacu* will better anſwer your Intentions; b above all, Lime-Water, in which have be boil'd two Ounces of Sulphur, two Dra of *Mercurius dulcis*, to which add four Ou ces of Spirit of Wine. In caſe the Bone infect

ected with the *Gangrene*, this Author ad-
s you to cleanse the Ulcer with Brandy,
put *Euphorbium* into it, laying else some
on the Compresses; but if all fail, to
e Recourse in due Time to Fire or Am-
tation.

Chilblains are painful Swellings, sometimes
nded with painful Inflammations, hap-
ing most commonly on the nervous and
rior Parts, as on the Heel, being occa-
'd chiefly by sharp and cold Air. As to
Cure, the affected Part must be washed
uently with Wine, in which has been
'd Allum and Salt, of which also a Pul-
may be made, with the Addition of
e, Meal, Honey and Brimstone. *Petro-*
alone, or *Unguentum Rosaticum* dissolv'd
the hot Juice of Turneps, is also very
od.

A *Panaritium* or *Paronychia* is a red and
y painful Tumour, arising more particu-
ly in the Extremity of the Fingers, at the
ot of the Nails, follow'd sometimes by
ever and a Gangrene, the Humour being
g'd betwixt the Bone and the *Periosteum*.
e Beginning of the Cure must be made
th anodine Cataplasms, such as are com-
ed of Milk, Linseed beaten, the Yolk of
Egg, Saffron, Honey, and Oil of Earth-
orms, with the Crum of white Bread. The
st Thing to be done is to endeavour to
sperse it, by Oil of Sweet Almonds, Su-
of Lead, Ear-Wax, or else the Balsam
Sulphur. The *Empl. de Mucilagin.* and
Asulph. dissolv'd in Wine, is both a good
ssolvent and Anodine. If there be a Ne-
sity to bring it to Suppuration, you must
d the Roots of white Lillies roasted to the
fore prescrib'd Cataplasm; or else apply a
ltise made with boil'd Sorrel, fresh Butter,
d a little Leaven.

Of the Erysipelas *and Erysipelatous Tumours in particular. From the same Author.*

AN *Erysipelas*, or St. *Anthony's Fire*, is a small Protuberancy, caus'd by a Flux of choler, lodg'd betwixt the Skin and the Flesh, discovering it self by its yellowish Colour, excessive Heat and Prickings. An *Erysipelas* that arises in the Head and Breast being the most dangerous, must above all others be manag'd as well by internal as external Remedies. Inwardly prescribe the Patient Antimony, Diaphoretick, Crabs Eyes, Egg Shells, Powder of Vipers, *&c.* or Elder Flower Water, four Ounces; Syrup of Poppy, an Ounce; add to it a Scruple of volatile Salt of Vipers, or Hartshorn. Cooling Clysters are also beneficial, but not Bloodletting, unless there be Signs of a *Plethora*.

Externally you may apply Linen Rags dip'd in Spirit of Wine camphorated, impregnated with Saffron, to be often renew'd; or else Chalk and Myrrh beaten to Powder, and strew'd upon a Sheet of Cap-paper, spread with Honey, and apply'd to the Tumour. To allay the Excess of Heat and Pain, infuse in a Gallon of White-Wine; Sugar of Lead, half a Dram; Camphore and *Theban Opium*, of each twenty Grains; Myrrh, two Drams: Dip Rags in this Liquor, and often repeat the Application. In an *Erysipelas* of the Face, dip a Canvass Cloth in a Composition of a Gallon of Whey, two Yolks of Eggs, and a Dram of Saffron; let the Patient keep a regular Diet, and for his ordinary Drink, let him make use of the Decoction of Hartshorn, the Tops of the Lesser Centaury, Pippins cut in Slices with Skin, Liquorice, *&c.*

The dry and moist *Herpes* partakes of the Nature of an *Erysipelas*, and are all cured almost by the same Remedies. The first is call'd a Tetter or Ring-Worm, and the other appears with yellow Bladders or Pustules, accompany'd with Itchings, which produce corroding Ulcers in the Skin.

Besides the before-mentioned Remedies, you may bath the affected Part with Lime-Water, or a Decoction of Wormwood, in four Ounces of which you must dissolve half a Dram of *Sal* Armoniack; or else put the same Quantity of Sugar of Lead in a Glass of the Decoction of Fumitory, or Chervil. Oil of Tartar *per Deliquium*, either by it self, or mix'd with the aforesaid Decoction, is also very proficuous.

Of

Of the Oedema *and Oedematous Tumours and Impoſtumes in particular: Taken from the ſame Author.*

AN *Oedema* is a white ſoftiſh Tumour, with little Pain, ariſing from the Setling of a pituitous Humour: Its Cure is to be perform'd by Fomentations, Cataplaſms, Liniments and Emplaſters. The Fomentation preſcrib'd by the Author in this Caſe, is to throw Bundles of Dwarf-Elder ſprinkled with Wine, into an Oven after the Bread is taken out, then, ſmoaking hot, untye them, and wrap them about the affected Part, by the Help of warm Linnen Cloths, and to be often renew'd. His Cataplaſms are a Compoſition of Camomil, Melilot, St. *John*'s Wort, Sage, Valerian, Pellitory of the Wall, the Roots of Briony and Onions, all boil'd together in White-wine, add ſome Honey, and a few Cummin or Fennel-ſeeds; or elſe Horſe-dung and Cummin-ſeeds beaten together, boil'd in Strong Vinegar, and mix'd with Barley-Meal to the Conſiſtence of a Pultiſe. His Liniments he prepares with an Ounce of *Diapalma*, half an Ounce of Unguent. Martial, Oil of Lillies, what is ſufficient; Cummin-ſeeds, half an Ounce; and Sal-Armoniack, half a Dram; reduced to a due Conſiſtence, with an Ounce of yellow Wax: Laſtly, if the Hardneſs remains, he preſcribes the Plaiſter of Mucilages, or that which is made of the Gums, *Bdellium*, *Ammoniacum* and *Galbanum*, diſſolv'd in Vinegar; all this while you muſt not neglect Purgatives, ſuch as Purge the Serofities. The Tumours and Impoſtumes that partake of the Nature of an *Oedema*, are the *Phlyctenæ* and *Emphyſema*, the *Batrachus*, the *Wens*, the *Talpa*, the *Bronchocele*, the *Ganglion*, the *Fungus*, the *Scurfs*, the *Scrophulæ* or *Strumæ* or Kings Evils; and all Sorts of dropſical Swellings.

The *Phlyctenæ* are Bliſters fill'd with a white and yellowiſh Humour. The *Emphyſema*, is a flatulent Tumour, containing Wind only with a little Phlegmatick Slime. The *Batrachus*, is a Bliſter fill'd with a ſlimy aqueous Humour under the To near the String. A Wen is a Tumour ſiſting of thick, tough, pituitous M and is reckon'd among the Encyſtated mours. A *Talpa* or Mole, is a ſoft pretty long Tumour, appearing moſt monly in the Face and Head, contain white, thick, pituitous Matter. A *chocele*, is a Tumour which ariſes on, o tends croſs the Throat, conſiſting of a Flegm, mix'd with a little Blood; it is reckon'd among the Encyſtated Swell A *Ganglion*, is a very hard Tumour, w out Pain, and moveable, caus'd by a Flegm; it always appears upon ſome N or Tendon. A *Fungus*, is a ſpongy mour, growing upon ſome Tendon has been bruis'd, or otherwiſe weaken'd ſome Hurt received. The Scurf, is a whi and ſcabby Tumour, which makes its pearance on the Skin of the Head, conſiſt of a viſcous and mix'd Flegm, having Root at the Bottom of the Skin. The S *phulæ* or King's Evil, are Tumours wh moſt generally make their Appearance the Glandules of the Neck; as alſo in other glandulous Parts of the Body, and conſiſt of a viſcous, ſerous Flegm, of a v malignant Nature, the Source of them ing commonly ſuppos'd to be in the Gl dules of the Melentery: Theſe ought a to be rank'd among the Encyſted Tumou Dropſical Tumours are occaſion'd by Settling of a conſiderable Quantity of ſero Matter in the Parts where they make th Appearance.

Of Baſtard or Encyſted Tumours, alſo of Critical, Malignant, Peſtilential, Venereal Tumours and Impoſtumes. From the ſame Author.

AN Encyſted or Baſtard Tumour or Im poſtume, is a gathering of mix'd an corrupt Humours, the Matter thereof bein contain'd in particular proper Bags Membranes, and are divided into a *Steat ma*, an *Atheroma*, and a *Meliceris*; th Wen, the *Bronchocele* and the Scrophulou Tumours, or the King's Evil. The *Bronch cele* always appears in the Throat, and

what hard, but ſtill without any Alte-
n of the Skin; the Scrophulous Tu-
rs are hard, unequal, and ſeated in
glandulous Parts of the Neck, Arm-
&c. but without any Alteration of the
. Theſe Tumours may be diſſolv'd,
the beſt Way is to bring them to Sup-
tion, and to extirpate the *Cyſtis* or Bag:
diſcutient Remedies in this Caſe, are
mary, Sage, Wormwood, Elder, Ca-
nil, Melilot, St. *John*'s Wort, Tobacco,
boil'd in White-wine, with Soot and
Mercurialis, to which you may add Oil
arth-worms, and make it up in Form of
ataplaſm, to be renew'd twice a Day:
following Plaiſter is very efficacious;
Emplaſt. Diachyl. and *Vigo's* Plaiſter,
t you pleaſe; Quickſilver and the Di-
Plaiſter, four Times the Quantity;
olve them together; mix as much Saffron
Oil of Tobacco with it, as will reduce
whole Maſs to the Conſiſtency of a
ſter to be ſpread upon thin Leather, and
e changed only once a Week; then
h and bath the Part with Urine and
e, and lay it on again: In the mean
le, you muſt not neglect proper Purga-
s, and a regular Diet. To bring theſe
mours to Suppuration, you muſt apply
lame Remedies as in other Kinds of Tu-
urs; but the Bag muſt be extirpated by
iding the Tumour into four Parts by
puration and conſuming the *Cyſtis* by
grees: But the *Bronchocele* will not ad-
of any Extirpation, by reaſon of its Si-
tion amidſt a great Number of Nerves,
ns and Arteries. As to the Critical
mours, they are ſuch as appear at the
rmentation of Diſeaſes in any Part of the
dy. The Malignant, are ſuch as prove
ſeborn, and will not yield to proper Re-
dies. Peſtilential Tumours or Impoſtumes
attended with a Fever, Faintings, exceſſive
ns in the Head, are contagious, and
monly ariſe in the Plague. Venereal
mours always appear at the Bottom of
Body, in the Groin, and proceed from
nion with an infected Perſon. The Cri-
l Tumours and Impoſtumes are divided
o the *Anthrax*, the *Boil*, the *Phlegmon*,
d the *Parotides* or Swelling in the Al-
nds of the Ears. The malignant Tu-
mours or Impoſtumes, are diſtinguiſh'd in-
to the Cancer and the King's Evil. The
peſtilential Tumours are Carbuncles or a
Sort of *Anthrax* that appear every where;
but eſpecially under the Arm-pits, and
Bubo's in the Groins. The Venereal Tu-
mours are diſtinguiſh'd into Botches, or
Bubo's and Cancers that appear on the *Pe-
nis*, and Wens and *Condylomata* in the Fun-
dament. The Difference betwixt a Peſtilen-
tial and Venereal Bubo may be diſtinguiſh'd
by their Situation and reſpective Accidents;
the Peſtilential lying higher, and the Vene-
real lower; beſides, a Fever, Sickneſs at the
Heart, and an univerſal Faintneſs or Weak-
neſs, are the ordinary concomitant Circum-
ſtances of the Former; whereas the Venereal
Bubo is always the Conſequence of an im-
pure *Coitus*, and is attended with no other
Symptoms than thoſe of common Tu-
mours, *viz.* Pain, Heat, Shootings or Prick-
ings: As for the Remedies, they may be
found among thoſe already preſcrib'd for
Tumours.

Of the Scurvy. From the ſame Author.

THis Diſeaſe is known by the Ulcers of the Mouth, which are very ſtinking; as alſo by exceſſive Salivation, great Pains in the Head, Dizzineſs, Epilepſies, Apoplexies, and Palſies. The Face being of a pale-red and dark Colour, is ſometimes puffed up or bloated, inflam'd and beſet with Puſtules: The Teeth are looſe and ake, the Gums are ſwell'd, itch, putrefy, exulcerate, and are eaten with the Canker; and the Jaw is almoſt immoveable, the Members are crooked and cannot be extended, the Patient becomes ſtupid and drowſy, ſo that he fetches his Breath with Difficulty, is obnoxious to Palpitations of the Heart, and Coughs and falls into Swoons: The Ulcers are ſometimes ſo malignant, that their Cheeks are entirely eaten up, and their Teeth ſeen; they are alſo much inclin'd to Vomiting, Looſeneſs and Gripes, and their Bowels are ſwell'd; they have red and livid Puſtules on their Belly and Privy-Parts, which ſometimes break out into Ulcers; their whole Body being dry'd, *&c.*

This

This Diſeaſe may be eaſily cur'd in the Beginning, but when it is grown inveterate, and invades the neceſſary Organs of Life, it becomes incurable, as well as when it is the Epidemical Diſeaſe of the Country, or the Perſons afflicted with it are old, or well advanc'd in Years. In undertaking the Cure, it is requiſite to begin with a good Diet, and to ſweeten the Blood; let the Patient take the Broth of a boil'd Fowl, eating Pullets and Eggs; in the Broth may alſo be put diverſe Sorts of Anti-ſcorbutick Herbs, to wit, Creſſes, Spinage, Parſley Roots, Aſparagus, Smallage, Scorzonera, Scurvy-graſs, *&c.* let him eat nothing that is high ſeaſon'd, nor acid or ſharp, let him drink pure Claret, without any adulterate Mixture, let him uſe moderate Exerciſe and Reſt: Laſtly, let him keep his Mind ſedate and free from all Manner of violent Paſſion.

The following Remedies taken inwardly, are very good for the Scurvy, *viz.* the Tincture of Flints, from 10 Grains to 30; Diaphoretick Antimony, from 20 Grains to 30; ſweet Sublimate, from 6 to 30; Mars Diaphoretick, from 10 Grains to 20; *Crocus Martis Aperitivus*, from 10 Grains to two Scruples; prepar'd Coral, from ten to a Dram; volatile Spirit of Sal-Armoniack, from 15 Drops to 30; Water-Creſſes, Spirit of Scurvy-graſs, Tincture of Antimony, or Sal Volatile Oleoſum, of any of theſe, from 10 Drops to 20 or 30; Spirit of Guajacum, from half a Dram, to a Dram and a half; Tartar Vitriolate, from 10 Grains to 30; the volatile Salt of Tartar, Urine, Vipers and Harts-horn, of each from 6 Grains to 15; Spirit of Gum-Ammoniack, from 8 Drops to 16; white Mercury Precipitate, from 10 Grains to a Scruple; Mercurial Panacea, from 6 Grains to 2 Scruples.

It is alſo expedient to give emollient and deterſive Clyſters to the Patient at Bed-time, his Body being always kept open by convenient Diet-Drinks; afterward let him take gentle Sudorificks, ſuch as are made of the Decoctions of Fumitory, Wild Cichory, Dandelion, Harts-Tongue, Scabious, the leſſer Houſe-Leek, Germander, Borage, Scorzonera Root and Polypody, with Flowers of Broom-Elder and Marygold. Theſe are ſtronger for cold Conſtitutions, *viz.* Decoctions of Scurvy-graſs, Arſmart, leſſer Celandine, Wormwood, Little-Leek, Trefoil, Angelica, Juniper-ber *&c.*

Convenient Decoctions to waſh Mouth may be made with Sage, Roſem Hyſſop, Oak-Leaves, Scurvy-graſs, Cre Tobacco, Roots of Biſtort, Birthwort, T mentil, Flower-de-Luce, Balauſtians, R Roſes, *&c.* To corroborate the Gu Gargariſms are made of Antiſcorbu Plants; as of Spirit of Scurvy-graſs, t Drams; one Scruple of Spirit of Vitri one Scruple of Common Salt, four Oun of Roſe-water and Plantane-water. But the Gums are putrefied, they are to rubb'd with Honey of Roſes, and ſo Drops of Spirit of Salt. To aſſwage Pains of the Members or Limbs, Bathi and Fomentations are to be uſed, and Decoction of Saxifrage taken inwardly, w ſome Grains of *Laudanum*, is good for t purpoſe.

To allay the Gripes, Clyſters may be ven with Whey, Sugar, Yolks of Eggs, rup of Poppies, and Oils of Earthwor Scurvy-graſs, Camomile, *&c.* Againſt ſcorbutick Dropſy; Take the Eſſence *Trifolium*, *Fibrinum*, and *Eleoampane*, fr 24 Drops to 30; and continue the U thereof. Milk taken inwardly hinders V miting, and a Broth or Jelly of Cr ſweeten the Blood: The Looſeneſs may ſtop'd with the Eſſence of Wormwood, Spirit of Maſtick; as alſo the Fever, w Febrifuges and Antiſcorbuticks.

The Spots may be fomented with D coctions of Aromatick and Antiſcorbu Herbs and Nitre. For the Ulcers of Legs, powder an equal Quantity of So of Lead, *Crocus Martis*, Myrrh, and *M curius Dulcis*, and arm the Pledgets w theſe that are to be applied to the Sores. mollify the Sharpneſs of acid Humours, is a good Remedy: Take half an Ounc Spirit of Scurvy-graſs, two Drams of Sp of Sal-Armoniack Tartariz'd, a Dram Tincture of Worms; give thrice a Day teen or twenty Drops of this Liquor Decoction of Firr-Tops. Againſt the bercles; Take two Handfuls of the Flo of Camomile and Elder, three Dram Briony Roots, and a Handful of

Bread crumb'd; boil the whole in Milk, and make Pultiſes thereof. To mitigate Pains in the Head; Take 20 or 35 Drops of the Tincture of Amber in Antiſcorbutick Spirits or Waters. The Difficulty of Reſpiration may be removed by a Compoſition of Antiſcorbuticks, Elecampane, and Spirit of Sal-Armoniack. To prevent the Putrefaction of the Gums; Take a Dram of the Tincture of Gum-Lacca, three Drams of Spirit of Scurvy-graſs, with 15 or 20 Drops of Oil of Tartar *per Deliquium*, and rub the Gums with this Compoſition many times a Day: Spirit of Wine camphoriz'd is likewiſe good, as alſo all Lotions or Waſhes made with Waters or Decoctions of Antiſcorbuticks. For Leanneſs, Goats Milk with Spirit of Scurvy-graſs may be us'd, and Apozems or Decoctions from Endive, Cichory, Sorrel, *Becabunga*, and Snail-water, may be us'd for the ſame Purpoſe. Ointment of *Storax* is frequently imploy'd in the *Hotel Dieu* at *Paris*, for Spots and Hardneſſes that ariſe in the Legs.

A general Deſcription of the Membranes, Nerves, Fibres, Veins and Arteries: Taken from Mr. St. Hilaire, *Mr.* Le Clerk, Gliſſon, Willis, Vieuſſeus, Diemerbroeck, Drake, &c.

A Membrane, according to *Diemerbroeck*, is a thin, white, or tranſparent flexile expanded Subſtance, ſerving to cover and cloath the other Parts, which is the proper and peculiar Uſe of it: When it is the Covering of a Veſſel, it is call'd a Coat or Tunic: Thoſe that cover the Brain, are by a peculiar Name call'd *Meninges* or *Matres*, of which more in their proper Place. But all the Membranes of the Body have this Faculty, to preſerve, unite together, ſtrengthen and give bounds to all the Parts they encloſe. They are ſupply'd with Nutrition after the ſame Manner with the other Parts, from the arterial Blood, which is convey'd into their very Subſtance by the Mediation of the Arteries, and the Fermentation ariſing from the Mixture of the Animal Spirits. They are the Organs of Feeling, according to *St. Hilaire*; for all the Parts that are endued with Senſe, except the Nerves, have no Senſation at all without the Membranes, and ſuch Parts as are deſtitute of them, as the Bones, the Cartilages, and the *Parenchyma* of ſeveral *Viſcera* have no Perception of Senſe, but according to the Membrane that inveſts them: Their Senſibility is communicated to them by the Animal Spirits, which flows in continually to them by the Nerves, and from the Moment that Influx ceaſes, their Senſation ceaſes likewiſe.

The Membranes are different ſeveral Ways, by reaſon of their Subſtance; ſome are thin or fine, others groſs and thick, ſome are more Legitimate or Natural, that is to ſay, true Membranes, as the *Pleura*, and the *Perioſteum*: Others illegitimate, or not ſo truly Membranes, but rather membranous Bodies, as Ligaments, Tendons, the Stomach, Inteſtines or Guts, the Urinary and Gall-Bladders, *&c.* ſome differ as to their Figure, being broad, others long, others triangular, *&c.* or from their Situation, ſome being internal, others external.

The Number of Membranes is almoſt infinite; nevertheleſs, the Principal and moſt Conſiderable are as follows: In the *Fœtus* are the *Chorion*, the *Amnios*, the Urinary Membrane, and in Brutes the *Alantoides*, throughout the humane Bodies, the Cuticle or Scarf-skin, the *Cutis*, the *Membrana Carnoſa*, the Membranes of the Muſcles,

the *Perioſteum*, and the Membranes of the Veſſels. In the Head, externally the *Pericranium*, or internally the two *Meninges*, which alſo deſcend from the Brain into the Cavity of the Spine, and encompaſs the Marrow, and afterwards extend the whole Length of the Nerves. In the Eye are ſeven Tunicks, the *Innominata*, the Conjunctive, the *Cornea*, the *Uvea*, the *Retina*, the *Aranea*, and the *Vitreum*. In the Ear, is the Membrane of the *Tympanum*: In the Mouth, is the Membrane properly belonging to the Tongue and Palate; and likewiſe that which is common to the Lips, the Gullet, and the Ventricle: In the Breaſt, is the *Pleura*, the *Mediaſtinum*, the *Pericardium*, the Tunick which cloaths the Lungs, the Heart, and the Valves of the Heart. In the lower Belly are the *Peritoneum*, the *Epiploon* or Caul, the Meſentery, and the Membranes which cloath every Bowel, beſides thoſe of the Inteſtines, the Bladder and other Parts, which will be more particularly handled in their proper Places.

Of Fibres in General.

Fibres are ſimilar Parts, that are white, ſolid, and oblong, in the Nature of Filaments or Threads, which exiſt as the former, and are deſtin'd for the Motion of ſome certain Parts, and the Preſervation of others. Their Action, as *Diemerbroeck* lays down, and as it is generally received, is to contract and diſtend, or relax again. *Riolan* ſays, it is rather to be attributed to its Uſe than its Action.

All the Muſcles are mov'd by the Fibres; and the Moment that they are cut, the Motion of the Muſcles periſh. The wonderful Communication of the Fibres of the Heart, with the *Viſcera*, procures a continual Motion of thoſe Parts. The Stomach, the Inteſtines, the Womb, the Bladder, and other the like Parts, are all furniſh'd with Fibres; to the End that they may have more ſtrength for Retention or Evacuation. In ſhort, all the Parts which have organick Actions, have likewiſe Fibres, as the Brain, the Lungs, *&c.* *Fallopius* is not abſolutely of that Opinion, but both he and *Veſalius*, tho' they allow the Arteries to have Fibres, doubt very much whether the Veins have any; which nevertheleſs, *Fernelius*, *Briſſotus*, *Fuchſius*, and ſeveral other great Men admit with Juſtice, and ſay, they ſerve to give Strength and Force to the Veſſels, as well for their Preſervation, as the regular Motion of the Blood. Experience likewiſe confirms their Exiſtence in the *Varices*, where we find, that the orbicular and oblique Fibres of the Veins are broken, their Tunicks diſtended and relaxed in an extraordinary Manner, ſo that they cannot contract, and be brought into their former Condition again.

There are three different Kinds aſſign'd to the Fibres, by reaſon of their Situation; the Firſt are right or ſtrait, which extend lengthways; the next tranſverſe, that croſs with the Right; and the Third oblique, which cut both the one and the other; but it is neceſſary to add, beſides theſe three Differences, the orbicular Fibres, ſuch as thoſe are which belong to the Sphincter Muſcle. 'Tis vulgarly ſaid, that the right Fibres attract, the Oblique retain, and that the Tranſverſe puſh forward: But *Fallopius* makes a Jeſt of theſe three Differences of Action, for they all attract, retain, or puſh forward in their Turns.

Of the Nerves in General. From Mr. Le Clerk, *Phyſician in Ordinary to the* French *King.*

THE Nerves are round white Bodies, enclos'd in a double Membrane, communicated to them from the two *Meninges* of the Brain: Their Office is to convey the Animal Spirits into all the Parts. All the Nerves take their Original from the *Medulla Oblongata*, and that of the Spine: The Diſtribution of them is directly perform'd by Conjugations or Pairs, whereof one goes to the Right Hand, and the other to the Left: There are nine Pair of them that proceed from the *Medulla Oblongata*, and enter into the Skull; and a tenth Pair that comes from the Marrow which lies between the Occipital and the firſt *Vertebræ* of the Neck; it paſſeth thro' the Hole of the *Dura Mater*, thro' which the vertebral Artery enters, to diſtribute its Branches into ſeveral Parts. The nine Pair of Nerves which proceed from

from the Root of the Brain, are chiefly deſign'd for the Senſes, and alſo for the Motion of their Organs; of which the Ancients diſcover'd only ſeven: The firſt Pair of Nerves is call'd the Olfactory, and ſerve for the Smelling. The ſecond Pair is the Optick Nerve, which ſerve for the Sight. The Third is term'd *Motorii Oculorum*, being ſerviceable for the Motion of the Eyes. The fourth Pair, *Oculorum Pathetici*, which ſhews the Paſſion of the Mind in the Eyes, whereto it imparts a String, as well as to the Lips. The Fifth is call'd the *Guſtative*, and appropriated to the Taſte, becauſe it ſends Twigs more eſpecially to the Tongue, as alſo to the Forehead, Temples, Face, Noſtrils, Teeth, and Privy-Parts. The Sixth is likewiſe for the Taſte, and goes to the Palate. The Seventh is the auditive Nerve, that enters into the *Os Petroſum*, where it divides it ſelf into many Branches, which, when gone forth, are diſtributed to the Muſcles of the Tongue, Lips, Mouth, Face, Forehead, Eyelids, *&c.* The Eighth is the *Par Vagum*, or wandering Pair, which is united to the Intercoſtal Nerve; as alſo to the Recurrent, *Diaphragmatick*, *Meſenterick*, *&c.* The Ninth Pair, after having form'd a Trunk with the Eighth, diſperſeth its Twigs ſeveral Ways; whereof one is join'd with the Twig of the Tenth, to be diſtributed together into the Muſcle *Sternohyoidæus*, and into the Tongue. The *Intercoſtal* and *Spinal* are not Pairs of Nerves, but only Branches or Twigs of other Pairs.

Of the Diſtribution and Uſe of the Thirty Pair of Nerves that proceed from the *Spinal* Marrow, there are Seven that go forth from the ſeventh *Vertebræ* of the Neck, Twelve from thoſe of the Back, Five from the Loins, and Six from the *Os Sacrum*, according to the following Progreſſion. The Firſt of the Seven Pair of Nerves of the Neck proceeds from the *Occipital* Bone and the Firſt *Vertebræ*, nam'd *Atlas*, its Fibres being loſt in the Muſcles of the hinder Part of the Head and Neck. The Second Pair ſprings from between the firſt and ſecond *Vertebræ* of the Neck; the Fibres whereof are loſt in the Muſcles of the Head, and in the Skin of the Face. The third Pair iſſueth from between the ſecond and third *Vertebræ* of the Neck, and its Fibres are loſt in the *Flexor* Muſcles and *Extenſors* of the Neck. The fourth, fifth, ſixth and ſeventh Pairs, proceed from between the *Vertebræ* as before, but their Fibres are loſt in the Neck of the *Omoplata* in the Arm, and in the *Diaphragm* or *Midriff*. Here it ought to be obſerv'd by the Way, that the Arms receive Branches, not only from the four laſt Pair of the Nerves of the Neck, but alſo from the two firſt Pair of the Back, which are extended even to the End of the Fingers: Whence it happens, that in the Palſy of the Arms, Remedies are uſually apply'd to the *Vertebræ* of the Neck; and that in *Phlebotomy* or letting Blood, Care muſt be taken to avoid pricking the Nerve, which attends the *Baſilick* Vein in the Cubit. The Twelve Pair of Nerves that have their Beginning from between the *Vertebræ* of the Back, are each of them divided into four Branches, as the others; and their Branches are diſtributed in like Manner to the Muſcles of the Breaſt, and to thoſe of the Back and *Abdomen*. The five Pair, which take their Riſe from between the *Vertebræ* of the Loins, have thicker Branches than the others, and the Diſtribution of them is made to the Muſcles of the Loins, *Hypogaſtrium* and Thighs. Of the ſix Pair of Nerves that proceed from the *Os Sacrum*, the Four upper, with the Three lower of the Loins, ſend forth Fibres to the Thigh, Leg and Foot; and the two laſt Pair impart Nerves to the *Anus*, Bladder, and Privy-Parts.

Of the Nerves: Taken from Dr. James Drake, *Fellow of the College of Phyſicians, and of the Royal Society.*

THere are ten Pair of Nerves which ariſe within the Skull, ſays Dr. *Willis*. The firſt Pair, is the Olfactory or Smelling Nerves; theſe, as ſoon as they have made their Way through the *Os Cribroſum*, are diſtributed in the Membrane of the Noſe only, which in Men being ſhort, and ſituate upon the *Os Cribroſum*, there is not much to be ſeen of it.

The Optick Nerves, which are the next Pair, have almoſt as ſhort a Progreſs, being

wholly ſpent upon the Tunicks of the Eye, of which the *Retina*, ſo call'd from its Reſemblance of Net-work, is an Expanſion of the inner or medullary Part of it only; and upon this, the Impreſſion of the Objects of Viſion are ſuppos'd to be made: Theſe Nerves paſs out of the Skull through two Perforations in the *Baſis* of the Skull, a little above the *Sella Equina*, near the four internal Proceſſes of the *Os Sphænoides*, which lead directly to the Orbit of the Eyes. About the Trunk of theſe Nerves, ſome Branches of the third and fifth Pair twine themſelves, ſending probably ſome Fibres to the Coats of it, in their Proceſs to the Tunicks of the Eye.

The third Pair are the *Oculorum Motoris*; theſe ariſe from the *Crura* of the *Medulla Oblongata*, near the annular Protuberance: Whence they march out between two Branches of the cervical Artery, and paſſing out of the Skull at an irregular oblong Hole, immediately underneath the former, is ſpent upon theſe Muſcles of the Eye, which are call'd *Attollent*, *Depriment*, *Adducent*, and *Obliquus Inferior*, except ſome ſmall Fibres which go into the Muſcle of the upper *Palpebra*.

The fourth Pair is the *Pathetick*, which riſes behind the *Teſtes*, and paſſes out of the Skull, at the ſame *Foramen* with the former Pair, and ſpends it ſelf wholly upon the *Trochlear* Muſcle. The two firſt Pair of theſe Nerves, ſerve only for Senſe, the firſt for Smelling, the latter for Sight; the two Latter, ſerve for both Senſe and Motion.

The fifth Pair, which is the Largeſt of all thoſe that come from the Brain, has its Uſe as well as Diſtribution more extended, ſerving both for Senſe and Motion, for Touch and Taſte: It ſends Branches not only to the Eyes, Noſe, Palate, Tongue, Teeth, and almoſt all other Parts of the Mouth and Face; but likewiſe into the Breaſt and *lower Venter*, by Means of the *Intercoſtals*, which are partly compos'd of Branches of this Nerve.

It ariſes from the Side of the *Protuberantia Annularis*, near the *Proceſſus Cerebelli*. It is at its Origine very large; but before its Egreſs from the *Dura Mater*, it is apparently divided into two Branches, conſiſting each of them of innumerable nervous Fibres or Bundles of little Nerves, of which thoſe of one Branch are pretty tough and firm, the other ſoft and lax, and therefore it is divided into a hard and ſoft Branch. It is cloath'd with a Coat from the *Dura Mater*; and a little beyond the *Os Petroſum*, on each Side of the *Sella Equina*, forms a *Plexus*, which is call'd *Ganglioformis*, which receives ſmall Branches of Arteries from the Cervicals, and ſends both correſpondent Veins to the *lateral Sinuſſes*.

Near the *Plexus Ganglioformis*, each of theſe Nerves is divided into an anterior and poſterior Branch: The Anterior or fore Branch, after having ſent ſome Twigs into the *Dura Mater*, is cover'd with a pretty thick Membrane, and enters the Receptacle on each Side of the *Sella Equina*, where it ſends off ſometimes one and ſometimes two Twigs; which together with a Twig of the ſixth Pair ſent off there likewiſe, end in the *Intercoſtal* Nerve; and as ſoon as it emerges from this Channel, it is again divided into three Branches, pretty near equal.

The upper of theſe three Branches, which is ſomewhat the Leſſer, paſſing thro' the *Foramen Lacerum*, to the Orbit of the Eye, is immediately ſubdivided into three leſſer Branches, of which the firſt having ſent off a Twig, to the *Tunica adnata* of the Eye, to the *Glandula Lachrimalis*, to the Muſcles that draw the Noſe upwards, to the Eye-lids, and their Orbicular Muſcles, which draws up the upper Eye-lid, is ſpent on the Muſcles of the Forehead, and the common Integument of the fore Part of the Head.

The ſecond Branch, running under the *Patheticks* and *Motorii*, is again divided into Two, of which the leſſer and outward Slip, which regards the leſſer *Canthus* of the Eye, ſends off ſeveral Fibrils into the Fat, which invelops the Optick Nerve, and joining with others from the third Pair, form a little Sort of *Plexus* upon the Trunk of the Optick Nerve it ſelf; from whence the Fibrils proceeding thro' the Fat, which covers the hinder Part of the *Tunica Sclerotica*, end ſome of them in the *Muſculus Depriment*, others in the *Adducens*, and the reſt in the *Tunica Sclerotica* it ſelf.

The

The Inner, which is the bigger Slip of the ſecond Branch, is again divided into four Twigs. The Firſt running over the Optick Nerve; againſt the great *Canthus* of the Eye, enters the *Tunica Sclerotica*, and is ſpent in the Membrane. The Second returning into the Skull by a peculiar Perforation, pierces the *Craſſa meninx*, to which it probably gives ſome Twigs, as the Difficulty of ſeparating it from it ſeems to argue, and ſometimes turning back again, paſſes out of the Skull, through one of the Holes of the *Cribriforme*, and is diſtributed into the *interior Membrane* of the Noſe. The third Twig goes towards the greater *Canthus* of the Eye, and is ſpent partly on the Eye-lids and their orbicular Muſcles upon the external Integument of the Noſe, and the Muſcles which draw it upwards. The Fourth is diſtributed by ſeveral Twigs into the Eye-lids, and the orbicular Muſcles. The third Slip of the ſuperior Branch, running under the Nerve of the Sixth Pair, and the *Abducent Muſcle*, is ſpent on the *Glandula Innominata*, and *Tunica Adnata*.

The leſſer inferiour Branch, before it goes out of the Skull, enters the Orbit of the Eye, and running along the Outſide of the *Muſculus Abducens*, goes out again at a little Perforation peculiar to it; after which, being divided into ſeveral Fibres, ſome of which go to the Integuments of the Cheeks, and the reſt to the Muſcles that raiſe the upper Lip. As ſoon as this Branch goes out of the Skull at the third *Foramen*, it is again divided into three little Branches, of which the Firſt, after having beſtow'd ſome Twigs upon the *Muſculus Maſſeter*, upon the Integuments of the Face, upon the Gums and Teeth of the upper Jaw, enters a peculiar *Sinus* of the Bone, making the lower Part of the Orbit of the Eyes, and goes out at a Hole particular to it; after which it is divided into ſeveral Fibrils, which go to the Teguments of the Face, to the upper Lip, to the Muſcle which draws the lower Part of the Noſe laterally, and to the inner Muſcle of the Noſe. The ſecond ſmall Branch running downwards behind the Ducts, which go from the Noſe to the *Fauces*, is divided into Two, of which the upper by many Twigs is diſtributed into the *Membrana Pituitaria*, the lower paſſing through a peculiar Hole on the hinder and lateral Part of the Bone of the Palate, is diſtributed into that ſpongy Fleſh that lines the Palate and the tough Membrane that covers it. The Third little Branch is ſpent on that Part of the *Membrana Pituitaria*, which lines the *Fauces* upon the *Uvula*, and Muſcles thereabouts, and upon the *Tonſils*.

The *Ramus Major* or *Poſterior*, after having beſtow'd ſome Twigs upon the *Dura Mater*, receives a Coat from that and the *Pia Mater* cloath'd, with which it paſſes out of the Skull through the Fifth *Foramen*, and having ſent off ſome Twigs to the *Muſculus Buccinator*, *Maſſeter*, and thoſe of the lower Jaw, is divided into three conſiderable Branches.

The Firſt of theſe being join'd by a Twig of the hard Part of the auditory Nerve from the Barrel of the Ear, goes to the Root of the Tongue, from whence proceeding forwards, it ſends ſeveral Twigs to the maxillar Glands: From the outer Side it ſends likewiſe divers others, which running along the inner Subſtance of the Tongue, end in Capillaries at the Extremity of it; and joining every where with the Branches of the Ninth Pair, ſerve both the Muſcles and the papillary Glands, and therefore ſeem to contribute as well to the Taſte, as the Motion of the Tongue.

The Second or middle Branch ſending off firſt one Twig, which is diſtributed partly into the maxillary Glands, and partly into the Muſcles *Styloglooſſus* and *Myloglooſſus*, enters the *Sinus* or hollow of the lower Jaw, along which it runs, accompanied with Branches of the carotide Arteries and little Veins which return to the internal *Jugulars*, and beſides ſending off a Twig to each Tooth, with the Membranes of the aforeſaid Veſſels, contributes towards forming a Membrane, which lines the whole *Sinus*. At the Fourth *Molaris* or Grinder, it is divided into two Branches, the Leſſer of which runs on to the very *Commiſſore* or joining of the Jaw; the Bigger paſſing out at a peculiar Perforation, is divided into ſeveral Fibres, which are diſpos'd into the Muſcles of the lower Lip, and into the Chin. The Third and exterior Ramifications

cations of this greater and posterior Branch is spent upon the *parotide Glands.*

The Sixth Pair of Nerves rise from the medullary Tracts of the *Centrum Ovale*, just below the *Processus Annularis*, and proceeding forwards, enter the same Receptacle or *Sinus* of the Skull, on the Side of the *Sella Equina*, as the fifth Pair does, where sending off a Twig consisting of three Fibres, which joining those of the Fifth Pair before mentioned, go to the *Intercostals*, it goes out of the Skull at the same Hole with the *Oculorum Motorii*, and ends in the abducent Muscles of the Eye: Besides which, it sends some small Twigs to the Tongue, and therefore is reckon'd among the gustatory Nerves.

The Seventh Pair, or auditory Nerves, pass out of the Skull thro' a Hole of the *Os Petrosum*, which is the Seventh Perforation. They arise from the medullary Tract of the Fourth Ventricle, and emerge behind the *Processus Annularis* near the Eighth Pair, with which the soft Part of it joins. As soon as it is pass'd out of the Skull, it is divided into two Branches, a hard and a soft one, which immediately part: The Hard entring a little *Sinus* in the uppermost Part of the Bone, which constitutes the Barrel of the Ear, where it sends off a Twig, which running towards the fore Part of the Skull, goes out of the *Os Petrosum*, and is distributed into the *Dura Mater*, except some small Twigs, which go to the Membrane which lines the Barrel, to the internal Muscles of the Ear, and to the fine Membrane that Cloaths the Inside of the Cavity of the *Apophysis Mamillaris*. After this, the hard Branch sends off two other Twigs, one of which joins the Nerves of the Eighth Pair, a little above its *Plexus Ganglioformis*; the other goes to the *Tympanum*, of which it makes the *Chord*, and creeping over the Handle of the *Malleolus*, goes out of the Ear, and runs downwards, between the *Musculus Pterigoidæus Internus* and the Tongue, into which latter, it sends a Ramification, which joins with a Twig of the posterior Branch of the Fifth Pair before describ'd.

Besides these, the hard Branch coming out of the *Processus Mamillaris*, sends some Twigs to the *Musculus Masseter*, and others to the Glands about the Ear, where being divided into two other Ramifications, the *Interior* of these having first bestow'd some Fibres upon the Glands themselves, turns off towards the Cheek, and is divided into several Fibrils, of which one joining with another belonging to the Fifth Pair, goes to the upper Lip. The rest are spent on the lower *Palpebra*, and upon the external Part of the Face.

The *exterior Ramification* of this hard Part, after having likewise bestow'd some Fibrils upon the Glands, out of which it issues, is divided into two other Ramifications, the upper of which is distributed into the *Musculus Quadratus* of the lower Jaw, and outer Part and Muscles of the lower Lip. The lower Ramification is spent upon the Integuments of the fore and lateral Parts of the Neck, upon some Muscles of the lower Jaw, and upon the Muscle *Mastoides*.

The Soft of the Seventh Pair is larger than the Hard, altho' it seems to consist of fewer Fibres. It is divided into three Ramifications, of which the Superior passes thro' a small *Foramen* peculiar to it, into the *Concha* of the Ear, where it expands it self, and forms a very fine Membrane, which lines all the inner Surface of it. The Second and Third Ramifications go likewise to the inward Part of the *Concha*, and semicircular Ducts, which they furnish with Membranes that are the immediate Instruments and Organs of Hearing.

The Eighth Pair, by the Ancients esteem'd the Sixth; is both by them and the Moderns call'd *Par Vagum*. These spring from the *Medulla Oblongata*, a little above the *Corpora Olivaria*, and pass out of the Skull through the same Perforations with the lateral *Sinusses* of the *Dura Mater*. Along with them, wrapt up in the same Coat from the *Dura Mater*, passes a Pair of Nerves, which has its Origine from the *Medulla* contain'd in the *Vertebræ* of the Neck, and is call'd *Par Accessorium*, which soon after its Return out of the Skull, leaves the *Par Vagum* again, and is distributed into the Muscles of the Neck and Shoulders. Besides, it is join'd by a Twig of the hard Part of the Seventh Pair, and at the *Second Vertebra* of the Neck, by the Nerves that issue from the

cervical Marrow there, and ſends forth ſeveral Twigs to the Muſcles of the *Larynx*, *Gula*, Neck, and the Parts thereabouts, eſpecially from the *Ganglioform Plexus*, form'd by its Union with a Branch of the Intercoſtal. After this, deſcending along the Trunk of the *Aſpera Arteria* to the *Thorax*, it makes another *Plexus* immediately under the *Clavicle*, from which *Plexus* on the right Side the recurrent Nerve on that Side has its Riſe, tho' on the Left it ſprings from the Trunk of the Nerve it ſelf. The right Recurrent is reflected at the *Axillary Artery*, and the Left at the deſcending Branch of the *Aorta*, and both run up along the Sides of the *Trachea*, to which they impart ſome Twigs, and end at laſt in the Muſcles of the *Larynx*. Theſe ſerve for the Formation and Modulation of the Voice, as appears by a Dog's not being able to bark after they are cut.

Over againſt the Origine of the great Artery, it ſends forth a conſiderable Branch towards the Heart, which ſplitting it ſelf preſently into Two, the leſſer Branch twiſts about and embraces the pulmonary Vein, the Bigger joining with that of the oppoſite Side, goes to the *Pericardium* and the Subſtance of the Heart and its Auricles, after having ſent off one Twig, which joining with others from the Trunks of the Intercoſtals, makes the *Plexus Cardiacus* ſuperior, which ſending out one Branch, which ſtrictly embraces the pulmonary Artery, beſtows the reſt upon the Heart it ſelf. Proceeding yet further, it ſends out divers Ramifications, which meeting again together, make the *Plexus Pneumonicus*, from which many nervous Fibres are ſent out, which embrace and conſtringe the Veſicles and Veſſels of the Lungs, as well thoſe of Air as of Blood, which they variouſly enfold and twine about.

In its Paſſage downwards, it diſtributes ſeveral Branches to the *Oeſophagus*, along which it runs. About the lower *Vertebræ* of the Back, the Trunk is divided into two Branches, call'd the External and Internal, which communicate with each other by the Concourſe of ſeveral Ramifications. But afterwards, theſe two principal Branches join again, the Internals of each Side with one another forming one Trunk; and the Externals by their Communication forming another, and paſſing the *Diaphragm*, they are ſpent upon the Stomach, eſpecially its upper Orifice: The Remainder of this Pair joins with the Intercoſtals in the Formation of ſeveral *Plexus* in the lower *Venter*, and in them it ſeems to terminate.

The Trunk of the intercoſtal Nerve conſiſts of nervous Filaments, deriv'd partly from the Brain, which are the Branches of the Fifth and Sixth Pair, and partly from the ſpinal Marrow by thoſe Branches which they receive from the vertebral Nerves. In each Trunk of theſe Nerves, before it arrives at the *Thorax*, are two *Plexus Ganglioformis*, call'd *Plexus Cervicales*, the upper of which receives a Branch of a Nerve from each Trunk of the *Par Vagum*, and is ſituate juſt at the Egreſs of the Skull. The next *Plexus* is about the Middle of the Neck, and ſends out divers Ramifications to the *Oeſophagus* and *Aſpera Arteria*, and one larger than the reſt to the recurrent Nerve: From this *Plexus* likewiſe deſcend two pretty conſiderable Ramifications to the *Cardiac Plexus*, which are join'd a little lower by a Third.

From this Second *Plexus*, the intercoſtal Trunk deſcends to the Clavicles, where being ſplit into two, it embraces and conſtringes the ſubclavian Artery. Thence entring the *Thorax*, it receives three or four Twigs from the upper vertebral Nerves together, with which it conſtitutes the *Plexus Intercoſtalis*; and from thence deſcends along the Sides of the *Vertebræ*, receiving a nervous Twig from every one of them to the *Os Sacrum*, and coming into the *Abdomen*, it forms ſeveral conſiderable *Plexus*, which are the *Lienaris*, *Hepaticus*, the two *Renales*, *Meſentericus Magnus*, and two little ones in the *Pelvis*.

After this has reach'd the *Abdomen*, it ſends off on each Side a conſiderable Branch, call'd by *Willis*, *Ramus Meſentericus*, out of which the aforenam'd *Plexus* are form'd. This Branch is divided into two others, of which the Bigger turning towards the Stomach, forms a *Plexus*, from which come four *Faſciculi* or Bundles of Fibres to the Stomach, to the Spleen, to the *Hepatick*

Plexus,

Plexus, and the great *Plexus* of the *Meſentery*.

Upon the right Side the *Meſenterick* Branch is ſubdivided into two, as is that of the left likewiſe, the Superior of which makes the main Part of the *Plexus Hepaticus*, from whence proceed a great Number of Nerves to the Liver, ſtrictly embracing, as it were, with a Kind of Net-work, the Blood Veſſels, and ſending out their reſpective Ramifications to the Gall, Bladder and *Biliary Ducts*, and likewiſe to the *Duodenum*, *Pylorus* and *Pancreas*. This *Plexus*, by Means of ſome Ramifications, communicates with the *Plexus Lienaris*, which is form'd out of the Branches of the left Intercoſtal, and likewiſe with the *Meſentericus Magnus* and *Renalis Dexter*.

The lower Branches of the Meſentericks, near the *Capſula Atrabilaria*, form the *Plexus Renales*, from whence ſeveral nervous Fibres go to the Kidneys, which accompany and involve the Blood-Veſſels, as in the Liver. The great *Meſenterick Plexus* is form'd out of the concurrent Branches of ſeveral other *Plexus*, and ſends its nervous Fibres through the whole *Meſentery* along with the *Meſaraick* Veſſels, which with various Circumligations they accompany to the Inteſtines. Other Branches it ſends to the Trunk of the *Aorta Deſcendens*, and to the *Ovaries* in Women. A little below the Kidneys, the Trunk of the Intercoſtals, verges a little Inwards, and deſcends into the *Pelvis* to the *Os Sacrum*, about the Beginning of which, together with the vertebral Branches, it makes the loweſt *Plexus* of the *Abdomen*, from whence a tolerable Branch being reflected a little upwards, make near the former another little *Plexus*, which is the leaſt of all.

From theſe two *Plexus*, a Branch is return'd to the great *Meſenterick Plexus*, which in its Way viſits the *Inteſtinum Rectum* and *Colon*. Another Branch deſcends from the lower *Plexus*, behind the *Inteſtinum Rectum*, to which all along it gives ſeveral Twigs. The Remainder having ſent off ſome Ramifications to the Ureters, proceeds downwards to the *Sphincter Ani*, into which, and the neighbouring Parts, it is diſtributed.

The Ninth Pair of Nerves ariſe from the middle Part of the *Centrum Ovale*; between the *Corpora Pyramidalia* and *Olivaria* of the *Medulla Oblongata* by three or four ſmall Twigs that go out of the Skull, near the *Proceſſus* of the *Os Occipitis*, and ſend their Branches to the Tongue, as well to the *Papillary* as *Muſcular* Part of it; and likewiſe to all the Muſcles that ſerve for the Motion of the Tongue, from whence theſe Nerves have been called *Linguæ Motorii*, tho' they cannot eaſily be excluded from the Name of *Guſtatorii* likewiſe; as they occur in that Office, with the Branches of the Fifth and Sixth Pair.

The Tenth, which is the laſt Pair, even with thoſe that will allow it to belong to the Brain, ariſes by two or three Branches from the *Medulla Oblongata*, juſt below the *Corpora Pyramidalia* and *Olivaria*, or rather at the Beginning of the *Medulla Spinalis*, from whence reflecting a little Backwards it goes out of the Skull, between the firſt *Vertebræ* of the Neck, and the *Proceſſus* of the *Os Occipitis* of the ſame Orifice, thro' which the vertebral Arteries enter, and is ſpent upon the external Muſcles of the Head and Ears. Authors have differ'd about the Number of Nerves that have their Riſe within the Skull, and this latter Pair is yet by many excluded from that Number. But this is a Controverſy of no great Importance, their Difference about the Diſtribution of them is more material, of which we ſhall have occaſion to ſpeak more largely hereafter.

Out of the *Medulla Spinalis*, ſprings thirty Pair of Nerves, which are nothing but Faſcicles of medullary Fibres, cover'd with their proper Membranes; ſeven of which proceed from the *Vertebræ* of the Neck, twelve from the *Vertebræ* of the Back, five from the *Vertebræ* of the Loins, and ſix from the *Os Sacrum*.

Of the Arteries: From Mr. Le Clerk, St. Hilaire, &c.

IF we examine into the Structure of the Arteries, we ſhall find them to be long round Canals or Pipes, conſiſting of four

Sorts of Tunicks or Membranes, which have their Riſe from the right Ventricle of the Heart, from whence they receive the Blood, and convey it to all the Parts of the Body for their Nouriſhment.

The Conſtruction of theſe four Tunicks of the Arteries, is thus; that the Firſt being thin and nervous in its outward Superficies, is in the Inſide a *Plexus* or Interlacement of ſmall Veins and Arteries and Fibres of Nerves, which enter into the other following Tunicks to nouriſh them. The Second ſticking cloſe to the Former, is altogether full of whitiſh Glandules, that ſerve to ſeparate the ſerous Particles of the Blood; the Third is entirely Muſcular, and interwoven with annular Fibres; the Fourth is very Thin, and hath its Fibres all Strait; by Means of theſe the Pulſe is carry'd on the Arteries, deriving its Original from the Heart, exactly anſwering to its Motion of *Diaſtole* and *Syſtole*.

The Firſt and great Trunk of the Arteries, is call'd the *Aorta* or thick Artery, which proceeds immediately from the left Ventricle of the Heart, whereto it communicates, before its Departure from the *Pericardium*, One or Two ſmall Branches call'd the *Coronary*: Afterward it is divided into two Branches, whereof one goes upward, and is term'd the aſcending Artery, and the other downward, under the Denomination of the deſcending Artery. The aſcending Artery riſeth upwards along the *Aſpera Arteria* or Wind-pipe to the *Clavicles*, and is there divided into two Branches, call'd the *Subclavian Arteries*, one whereof goes forward to the right Side, and the other to the Left; and they both ſend forth on each Side divers Branches, which take their Names from the ſeveral Parts whereto they are diſtributed; ſuch as the *Carotides*, or *Soporales Interni & Externi*, which paſs to the Head; the *Mediaſtina*, the *Intercoſtal*, the *Axillar*, and others.

The *Deſcending Artery*, before its Departure from the Breaſt, affords certain Branches to the *Pericardium*, *Diaphragm*, and lower Ribs; afterwards it penetrates the *Diaphragm*, and conſtitutes ſeven double Branches. The Firſt, is of thoſe that are call'd *Celiack*, and which go to the Liver and Spleen; the Second Branch contains the upper *Meſenterick*; the Third, the Emulgent, which paſs to the Reins; the Fourth, the Spermatick, which are extended to the Genitals; the Fifth, the lower *Meſenterick*; the Sixth, the *Lumbares*; and the Seventh, the *Muſcular*. But as ſoon as the great Trunk is come downwards to the *Os Sacrum*, it divides it ſelf into two thick Arteries nam'd the *Iliack*, which are diſtributed on both Sides, each of them making two internal and external Branches, which likewiſe impart Sprigs or leſſer Arteries to the *Bladder*, *Anus*, *Matrix*, and other adjacent Parts: Then the Maſter-Branch forms the crural Arteries on the Inſide of the Thighs, which are communicated by multiplying their Number, even to the Ends of the Toes, in paſſing over the external Ankle Bones of the Feet.

Of the Arteries: From Bartholin, Diemerbroek, Veſalius, &c.

AN Artery is a Similar, Spermatick, Membranous, Slender, Hollow Part, united to the Veins by *Anaſtomoſis* or otherwiſe; containing the nutritious Blood with the vital Spirit, carrying it to all the Parts of the Body: There are two Sorts, the great Artery or *Aorta*, and the *Arteria Pulmonalis* or pulmonick Artery. The great Artery comes from the left *Ventricle* of the Heart, which, except in the Brain and other ſofter Parts, conſiſts every where elſe of a *double Coat*: The Outermoſt of which, is of the Thickneſs of the Veins; but the Inmoſt is five times Thicker, leſt by continual Pulſation about the Head and ſolid Parts, it might incur an incurable Rupture.

It receives three Valves, call'd *Sigmoides*, looking outwardly, coming out of the *Ventricle* of the Heart, with a great Orifice, before it perforates the *Pericardium* it affords to the Heart it ſelf the *Coronary Artery*, as it divides into the aſcending and deſcending Trunk. The aſcending Trunk, which is the Leſſer, reſting upon the Wind-pipe, is ſeparated into the two *Subclavians*; from which, being yet within the Breaſt, proceeds, Firſt, The *Intercoſtalis Superior*, proper to the four upper Ribs. Secondly, The *Mammaria* to the Breaſts. Thirdly, The *Cervicalis* to the

Muſcles of the Neck. Fourthly, the *Carotides*, external and internal, proper to the *Larynx*, Tongue, Neck, Head and Brain. When they have left the *Thorax*, they are call'd *Axillares*, and carry Nouriſhment to the Breaſt: 1. By the *Thoracica ſuperior*; 2. The *Thoracica inferior*: 3. The *Scapularis*; and, 4. The *Humeraria*. Then they approach the Arm, where they accompany and lie under the Branches of *Vena Cava*, and are call'd by the ſame Name as they are.

The Deſcending Trunk, which is the greater, being yet within the Breaſt, ſends, 1. The *Intercoſtalis ſuperior* to the eight lower Ribs; 2. The *Phrenica* to the *Diaphragm* and *Pericardium*: Then having perforated the *Diaphragm*, it communicates, 1. The *Cœliaca* to the Stomach, from which proceeds the *Splenica* and *Gaſtro Epiploica dextra*; 2. The *Meſenteria ſuperior*; and, 3. The *Inferior* to the *Meſentery*; 4. The Emulgents to the Kidneys; 5. The Spermaticks to the Teſticles; 6. The *Lumbares* to the Loins; and, 7. *Muſcula ſuperior* to the Muſcles of the *Abdomen*. Then at length it is divided into the two *Iliack* Branches, about this Diviſion exhibiting the *Muſcula ſuperior*, *Epigaſtrica*, *Hypogaſtrica*, *Umbilicalis* and *Pudenda*. Out of the *Abdomen* they change their Names, and are call'd *Crurales*, and ſo they deſcend into the Feet, all along accompany'd with the Veins, from which they borrow their Names. Their Uſe is to carry the nutritious Blood with the vital Spirits into all Parts.

The *Arteria Pulmonalis*, which the Ancients falſly call'd *Vena Arterioſa*, becauſe it had Pulſation, was made up of a double Coat, and contain'd the nutritious Blood iſſuing out of the Heart with a double Branch, enters the Lungs, and is diſtributed through them by many little Branches, carrying to them the Vital Blood, and then into the Pulmonick Vein, by which Means it is return'd into the Left Ventricle of the Heart. It hath three Valves, call'd *Sigmoides*, which ſtand outwards, leſt the Blood that having enter'd it, ſhould ſlide back again into the Ventricle of the Heart.

Of the Veins. From Mr. Le Cler St. Hilaire, *&c.*

THE Structure of the Veins is form'd out of long and round Canals, made up of four Kinds of Tunicks or Membranes, whoſe Office it is to receive the Blood that remains after the Nouriſhment is taken, and to carry it back to the Heart to be reviv'd. The Form of the Tunicks of the Veins is, 1. A Contexture of nervous and ſtraight Fibres; 2. A *Plexus* of ſmall Veſſels, that carry the Nouriſhment; 3. It is all over beſet with Glandules, through which are filtrated the ſerous Particles of the Blood contain'd in the Veſſels of the ſecond Tunicle; 4. A Series of annular and muſcular or fleſhy Fibres.

The Number of the Veins exceeds that of the Arteries, for there are ſcarce any Arteries without Veins, but many Veins without Arteries; but the Original of all the Veins is in the Liver, and the two great Trunks that proceed from thence are call'd the *Vena Porta*, and the *Vena Cava*. The *Vena Porta* is diſtributed to all the Parts contain'd in the Lower Belly, and terminated in the Fundament, where it makes the internal *Hæmorrhoidal Veins*.

The *Vena Cava* is immediately divided into two thick Branches, one whereof ariſes upward to the Right Ventricle of the Heart, and forms the *Aſcending Vena Cava*, as the others go downward to the Feet, and conſtitute the *Deſcending*. The *Aſcending Vena Cava* perforates the *Diaphragm*, goes to the Heart, and aſcends from thence to the Clavicles, after having communicated to the *Midriff* in paſſing a ſmall Branch call'd the *Phrenicus*; as alſo one or two to the Heart nam'd the *Coronary*; and ſome others to the upper Ribs; beſides the ſingle Branch term'd *Azygos* only on the Right Side: But the Trunk of the *Aſcending Vena Cava* being once come up to the *Clavicles*, is divided into two Branches, well known by the Name of the *Subclavian*, one whereof ſhoots forth toward the Right Side, and the other toward the Left, and they both make various Ramifications, like to thoſe of the thick *Aſcending Artery*, by producing the *Cervicales*, and the inter

internal and external *Jugulars*, that go to the Head; as alſo the *Axillaries*, which paſs to the Arms and Shoulders, forming the *Cephalick*, the *Median*, and Baſilick or Liver Vein, on the Inſide of the Arm.

The *Deſcending Vena Cava* in like Manner accompanieth the Ramifications of the *Aorta* or thick *Deſcending Artery* to the fourth *Vertebræ* of the Loins, where it ſends forth two Branches, nam'd the *Iliack*, one whereof goes to the Right Side, and the other to the Left, both inwardly and outwardly, imparting divers Twigs or leſſer Branches to all the Parts contain'd in the *Abdomen* or Lower Belly, even as far as the Fundament, where it makes the external *Hæmorrhoidal Veins*. Afterward the outer Branch of the *Iliack* deſcends within the Thigh, to form the *Crural*, and others as far as the *Saphæna*, together with thoſe that are at the End of the Feet.

Of the Veins. *From* Bartholin, Diemerbroek, Veſalius, *&c.*

A Vein is a ſimilar, ſpermatick, membranous, long, hollow Part, join'd by *Anaſtomoſes* to the *Arteries*, and conveying the Blood back to the Heart. The Veins are of three Sorts, ariſing from theſe three different Springs, the *Vena Cava*, the *Porta*, and the *Vena Pulmonalis*. The *Vena Cava* and *Porta* take their Beginning from the Liver. There are thoſe who would fain have that come from the Heart, from a weak Argument taken from unborn Embrio's.

The old Anatomiſts perſwaded themſelves that the Roots of the *Vena Cava* and *Porta* were united by mutual Inoſculations; but the curious Inquiſition of the Moderns hath both found out and clearly demonſtrated them to be join'd together, but not ſo united that the Blood in thoſe Places can paſs out of one into the other; for the Extremities of the aforeſaid Veſſels, by means of the *Parenchyma* of the Liver, do ſo mutually conſent, that Milk or any liquid Thing caſt into the *Vena Porta* with a Syringe, finds an eaſy Paſſage into the *Vena Cava*, without either any Injury of the Veins or the *Parenchyma*.

The Veins have only one Coat or Tunicle, with many Valves within them, and are nouriſh'd with Blood from little Arteries diſpers'd amongſt them, and not from the Blood contain'd within themſelves. They are endow'd with Feeling from the Nerves, and their Uſe is to receive Blood from the Arteries, and return it back to the Heart again.

For Method's Sake, we will deſcribe all the Veins here particularly, and divide them into their Branches: Firſt the *Vena Cava*, taking its Riſe from the Liver, is ſeparated into the *Aſcending* and *Deſcending Trunk*. The *Aſcending*, which is the greater, perforates the *Diaphragm*, and is divided into Four Branches: 1. The *Phrenica*, which diſperſeth it ſelf through the *Diaphragm* and *Pericardium*: 2. The *Coronaria*, appropriated to the *Baſis* of the Heart, and proceed from the Trunk it ſelf, after it hath penetrated the *Pericardium*, and inwardly united it ſelf by a large fleſhy Orifice to the Right Tunicle of the Heart: 3. The *Azygos* or *Vena ſine Pari*, coming from the Right Side of the ſame Trunk, when aſcending, it hath paſs'd the upper Part of the *Pericardium*, affording chief Branches to the eight lower Ribs; then about the fleſhy Appendices of the *Diaphragm* it enters the Cavity of the Lower Belly, where on the Left Side 'tis inſerted into the *Emulgent Vein*, on the Right into the Trunk of the *Cava*: 4. The *Subclavians*, from whom come ſeveral Branches which go both upward and downward.

The *Superiors* are, 1. The *Muſcula ſuperior*; 2. The external and internal Jugulars: The former of which goes on both Sides, ſometimes ſingle, ſometimes double, to the Neck, Head and Face; the latter or internal to the thick *Meninx* of the Brain, to whoſe third *Sinus* its greater Branch is united. The *Inferiors* are, 1. The *Intercoſtalis*, ſerving the four upper Ribs, and their Intercoſtal Muſcles; 2. The *Mammaria*, which is carried to the Breaſts; 3. The *Mediaſtina*, which goes to the *Mediaſtinum*, and the Gland *Thymus*; 4. The *Cervicalis*, which goes to the Neck; 5. *Muſcula inferior*, which goes to the Muſcles of the Neck; 6. The *Thoracica inferior*; and, 7. The *ſuperior*, both which go to the Muſcles of the Breaſt.

The *Subclavians* being come out of the Breaſt or Cavity of the *Thorax*, are call'd *Axillares*, then ſupply the Arms, where they are divided into three Branches, which are, 1. The *Cephalica*, which paſſes into the Hand, between the Little Finger and the Ring Finger, and is nam'd *Salvatella*. Its Branches are variouſly mix'd into the Branches of the *Mediana*. 2. The *Baſilica* or *Liver Vein*. 3. The *Mediana* or Middle Vein, which proceeds with other Branches from the *Baſilica*.

The Deſcending Trunk of the *Vena Cava* is leſs than the Aſcending, and is undivided till it comes to the fourth *Vertebra* of the Loins; then it communicates, 1. A Branch call'd *Adipoſa* to the Membranes of the Kidneys; 2. The *Emulgents* to the Kidneys themſelves; 3. The *Spermaticks* to the Teſticles; 4. The *Lumbares* to the Loins, and to their *Vertebræ*. Nearer to the *Os Sacrum* it is ſeparated into two Branches call'd the *Iliaci*. Before they go to the Feet, the Trunk it ſelf, 1. Preſents the *Muſcula ſuperior*, which runs to the Muſcles of the Loins and the *Peritonæum*; 2. The *Sacra*, which is ſometimes ſingle and ſometimes double, and is beſtow'd on the *Os Sacrum*; 3. The *Muſcula Media*, which paſſeth to the Buttocks, as the *Hypogaſtrica* to the Bladder and its Neck, the *Sphincter* of the *Anus*, the *Penis*, and the Neck of the Womb; the *Epigaſtrica* to the Muſcles of the *Abdomen* and the *Peritonæum*; the *Pudenda* to the Privy Parts; and the *Muſcula inferior* to the Joint of the Hips.

The *Iliack Branches*, as ſoon as they have left the Cavity of the Belly, are call'd *Crurales*, from which proceed, the *Iſchiatica minor*, which goes to the Skin and Muſcles of the Hip; the *Iſchiata major* to the Hip, and then to all the Toes; the *Poplitea* to the Ham; the *Suralis* to the Muſcles of the Calf of the Leg; and the *Saphena* to the Knee, Ankle, and to the upper Part of the Foot, and the great Toe. The *Vena Cava*, as it comes out of the Heart, receives three Valves call'd *Tricuſpidales*, to make the Blood more freely enter into the Heart, and to prevent its Return.

The *Vena Porta*, which is much leſs and looſer than the *Vena Cava*, ariſeth from the Umbilical Vein, and with many Roots is inſerted into the Liver. It is divided, after it iſſues out of the Liver, into the Trunk and Branches, all which are diſtributed into ſeveral Parts contain'd in the Lower Belly. From the Trunk proceeds, 1. The *Gaſtric Epilois*, which goes to the Caul and Stomach; 2. The *Inteſtinalis*, that paſſes to the Inteſtine or Gut call'd the *Duodenum*; 3. The *Gyſticæ Gemellæ* to the *Gall*, and the *Gaſtrica minor* to the Left Side of the *Stomach*. Then this Trunk is divided into two great Branches, the *Splenick* and *Meſenterick*.

The *Ramus Splenicus* or *Splenick Branch*, ſometimes joining to the Sweetbread, ſometimes paſſing through it, divides it ſelf into Four little Branches as ſoon as it has left it, which are theſe: 1. The *Vena Gaſtrica major*, which goes to the Spleen, communicating from thence three or four ſmall Veins to the Stomach. Theſe being blown up in living or dead Bodies, ſhow plainly that nothing at all can enter into the Cavity of the Stomach, and ſo by Conſequence no Humour coming from the Spleen, as has been formerly ſuppoſed by the Learned Men, ſeeing they terminate in the Coats of the Stomach, and open not into the Cavity it ſelf. 2. There is the *Epiploica dextra*; 3. The *Coronaria Stomachi*; 4. The *Epiploica ſiniſtra*. The *Meſenterick* Branch is alſo divided into Four others. Of theſe, the the Firſt retains its old Name, and is diſtributed with Fourteen Branches or more through the *Meſentery*. 2. The *Vena Hæmorrhoidalis*, that goes to the *Spleen*, the Womb, and the *Inteſtinum rectum* or *ſtraight Gut*; 3. The *Vena Cæcalis*, that ſupplies the blind Gut; 4. The *Ramus Meſocolicus*, the Branch that goes to the Gut *Colon*.

The *Vena Pulmonalis*, which the Ancients corruptly call'd *Arteria Venoſa*, ſeeing it hath but only one Tunicle, and no Pulſation of it ſelf, but returns the Blood as other Veins do, iſſues out of the Left Ventricle of the Heart with a wide Orifice, and goes to the Lungs to receive the Blood from the Pulmonick Artery, and carry it to the Heart. About its Egreſs thence it has two Valves call'd *Valvulæ Mitrales*, that hinder the Return of the Blood upon the Lungs, its Uſe being to carry the Blood received from the Pulmonick Artery into the Left Ventricle of the Heart.

An Account of divers Schemes of Arteries and Veins diſſected from adult humane Bodies, and given to the Repoſitory of the Royal Society by John Evelyn *Eſq*; *F. R. S. To which are ſubjoin'd, A Deſcription of the Extremities of thoſe Veſſels, and the Manner the Blood is ſeen by the Microſcope to paſs from the Arteries to the Veins in* Quadrupeds *when living: With ſome Chirurgical Obſervations and Figures after the Life. By* William Cowper, *F. R. S. Taken from the Philoſophical Tranſactions*, Numb. 280. *for* July *and* Auguſt, 1702.

THE annex'd Figures of the *Arteries* and *Veins*, that is, Fig. I. VI. and VIII. were drawn after the Veſſels themſelves, paſted and dry'd, which were diſſected from adult humane Bodies, and diſplay'd on Tables now to be ſeen in the Repoſitory of the Royal Society, and are the generous Preſent of *John Evelyn* Eſq; from whom I received the following Letter concerning them, *&c.*

For Mr. *Cowper.*

HEaring, Sir, that you are cauſing the Tables of Veins, &c. which I ſome Time ſince brought out of Italy, *to be accurately delineated, in order to their being engraven, as more correct than any that are yet to be found among the Figures of thoſe Veſſels in Books of Anatomy, and deſirous to underſtand how they came to my Hands, I ſend you this little Hiſtory of them for your Satisfaction:*

Being ſome Years ſince in Italy, *and curious of ſeeing the many repeated Diſſections at the Anatomical Theatre at* Padoa, Cavalier Veſtlingius *being then Profeſſor, and reading on divers Bodies ſeveral Days during the* Lent, *Dr.* Johanno Athelſteinus Leoncence, *who was then Operator, by extracting the Veins, and other Veſſels which contain the Blood, Spirits, &c. out of humane Bodies, which the many Hoſpitals and Infirmaries of that City plentifully afford, began to apply and diſtend them on Tables according to their natural Proportion and Poſition, as an Improvement which might be of Uſe in Anatomy. Some of theſe Tables being finiſh'd with the Direction and publick Approbation of the Profeſſor, and ſeveral other learned Phyſicians and Anatomiſts preſent at thoſe Lectures and Operations; and underſtanding that* Leoncence *was going ſhortly (I think) into* Poland, *and willing to diſpoſe of his Tables before he took his Journey, I deſired the late Dr.* George Rogers, *Conſul then at* Padoa *for the Students of our Nation in that Univerſity, to purchaſe and procure them for me, which he did (as I remember)*

ber) for 150 Scudi; *with Condition that he ſhould add a Table more, namely, that of the Liver, Gaſtrick Nerves, and other Veſſels, to compleat the Fourth. When theſe were perfected, I immediately ſent them to* Venice, *from whence they were ſhipped for* England: *But upon what Accident or Occaſion I know not, the Veſſel was carry'd into* Holland, *and lay there a Year or Two without any Tidings what was become of my Concerns, being then my ſelf at* Paris, *till coming at laſt to be unladen, Sir* Richard Ford, *afterwards Lord Mayor, finding, by ſome Papers and Letters with Directions on the Caſes, and ſeveral Bales of Books and other Things which I had been collecting in* Italy, *that they belong'd to me, took Care to have them all ſafely convey'd to me to* London, *to my no ſmall Charges. Dr.* Scarborough *was one of the firſt I ſhew'd the Tables to, who would have tempted me to part with them for a very conſiderable Sum, (as I ſuppoſe) for my Lord Marqueſs of* Dorcheſter; *which I refuſing, he deſired I would lend them a little while to the College, where he read upon them, and kept them above a Year, and then return'd them to my Houſe at* Says's-Court *near* Deptford, *where they remain'd till the Happy Reſtoration; when His Majeſty* Charles *II. hearing of them, was pleaſed to come and ſee them himſelf with great Satisfaction. The* Royal Society, *for the Promotement of Natural and Experimental Knowledge, being a little after inſtituted and founded by that Curious Prince, and meeting at* Greſham-College, *I made a Preſent of my Tables to the* Repoſitory.

J. Evelyn.

The Firſt, Sixth and Eighth Figures are cloſely drawn after the original Schemes, and I am apt to flatter my ſelf they will be acceptable to the Inquiſitive. It is ſome Satisfaction that I find the Arteries here ſo agreeable to a Figure which I drew, and publiſh'd not long ſince, from the *Arteries* of a *Fœtus* injected with Wax: But this Figure of the *Veins* differs ſo much from any extant, as would incline one to ſuſpect all of the Subject hitherto publiſh'd are fictitious, not excepting even thoſe of *Veſalius*. But firſt of the Arteries.

That the *Arteries* are the Veſſels which convey Blood from the Heart to all Parts of the Body is well known; and we ſee by Fig. I. that the common Practice of Nature in diſtributing theſe Veſſels to ſupply Parts with Blood is from the next adja Trunk, till their Aſcending and Deſcen Trunks become Conical, as well as Collateral Branches; not that all the Tr and Ramifications of Arteries are Unif and become Conical in the ſame Ma nor do all of them paſs directly to the to which they convey Blood, nor do Parts receive *Arteries* from their neighb ing Trunks.

The Trunks of the *Carotide*, *Vertebral Splenick Arteries*, are not only contorte their Progreſs in the Adult, but the Dia ters of their Bores are variouſly dilate divers Parts of them, eſpecially where are contorted: But as theſe Dilatation their Trunks are caus'd by the Reſiſtance Blood meets with at thoſe Angles of flexion, ſo thoſe *Enlargements* of them a wards contribute to retard the Protru of the Blood to the Extremities of t *Arteries*. Hence it is, that as the *Arteri* the *Fœtus* are not *contorted* in ſuch a Angles as in full grown Bodies, ſo t Trunks are more Conical, and not here there dilated in divers Parts of them a the Adult. The Trunk of the *Splenick tery* has a ſtraight Progreſs in the *Fœtus* in Infants, but in the Adult I have hith conſtantly found it very much contorted expreſs'd in Fig. 1, 2, 3.

The peculiar Contrivances of the Sper tick Arteries of *Quadrupeds*, as well as M ſhew a conſtant Deſign in Nature of tak off that Velocity with which the Blo would otherwiſe paſs through the Gland the *Teſtes*. It ſeems to be for this End t the *Teſtes* of moſt Animals, eſpecially M and *Quadrupeds*, hang out of the Cav of their *Abdomens*, that the Canals of t Blood Veſſels may be lengthen'd; for Spermatick Arteries, contrary to all oth ariſe from their great Trunk at a far gre Diſtance from the *Teſtes* than the Arterie any other Part of the Body: Nor wo the *Teſtes*, which are ſuch neceſſary Org have been thus expos'd to external Inju if the End of Nature in lengthening t Blood Veſſels had not been very conſ rable. Beſides this lengthening of the Sp matick Arteries, we find Nature ſtill triving other Impediments to check the C

t of the Blood in thoſe Parts; it ſeems this End, that the *Spermatick Arteries* kſſen'd at their Original from the unk of *Arteria magna* in Men, and that *Spermatick Arteries* of *Quadrupeds*, are much contorted before they reach their *ſtes*. The principal Inducement of Na- e in making uſe of theſe different Con- rances in the *Spermatick Arteries* of Men d *Quadrupeds* ſeems to be,

That if the humane *Spermatick Arteries* re contorted, as in *Quadrupeds*, before y reach their *Teſtes*, the Apertures in the dominal Muſcles of Man muſt be much rger than they now are, and would fre- ently let the Inteſtines deſcend into the *rum* which we know, nevertheleſs often ppens: Such Ruptures as they are call'd, e not ſo incident to *Quadrupeds*, tho' the ſſages for their Spermatick Veſſels, thro' eir *Abdominal Muſcles*, are much wider an in Men; becauſe the Poſition of the runks of their Bodies is Horizontal, and eir Inteſtines therefore cannot Preſs on the roceſſes of the *Peritonæum*, as in Men who e erect. Beſides theſe Artifices in diſpo- ng the Trunks of *Arteries*, I doubt not t much more will be detected by the In- ſtitive: In the mean Time, I ſhall at pre- nt purſue the Thread, and deſcribe the xtremities of the Arteries, with their ommunications with the *Veins*, and after- ards produce ſome Inſtances of the Art of Nature in conveying the refluent Blood to e Heart.

After the Circulation of the Blood rough the Heart, Lungs, and large Blood- eſſels, was demonſtrated by Dr. *Harvey*, was only gueſs'd how the Extremities of e Arteries tranſmitted the Blood to the eins, till Mr. *Lewenhoeck's Microſcopes* had iſcover'd the Continuations of the Extre- ities of thoſe Veſſels in Fiſh, Frogs, *&c.* hich is now commonly ſhewn by Micro- opes made by other Hands: Yet there are ot wanting thoſe who doubt of the like ontinuations of the Extremities of Arteries nd Veins in *humane Bodies* and *Quadrupeds*; nce thoſe Animals, it has hitherto been en in, to any Satisfaction, as Mr. *Lewen- ck* confeſſes, have been either ſuch Fiſh, of the amphibious Kind, that have but *Ventricle* in their Hearts, and their Blood actually cold, except in Bats, in which it appears very obſcurely: Add to this, that the Blood in thoſe Creatures does not circulate with ſuch Rapidity as in Animals, whoſe Hearts have *two Ventricles*; for all Animals that have Bicentory Hearts, the Veſſels of the reſt of the Body return their Blood to the Heart in equal Time and Quantity with thoſe of the Lungs, notwithſtanding the Inequality of their Courſe.

This Difference in the principal Organs of the Circulation of the Blood in thoſe Creatures, on which only theſe Experiments have been hitherto made, mov'd me to make Sound on Animals whoſe Organs differ only from the Humane in their groſs Figure, and not in their intimate Structure: For this End I took a young Cat, about 10 or 12 Days old, and faſten'd it to a Board, as in Live Diſſections, and making an Inciſion through the *Linea alba*, the *Omentum* and *Inteſtines* were extruded; then cauſing the Creature to be ſo held on the Board, under a large *double Microſcope*, where a flat Glaſs for receiving of Objects was plac'd Horizontally, on which I expanded the *Omentum* or *Caul*; a Light being plac'd underneath, I ſaw the Globules of the Blood move very ſwiftly in the ſmall Veſſels, which are only to be ſeen in the moſt tranſparent Parts of the Membranes of its *Omentum*; but the Motion of the Blood ſoon abated, and its Globules were withdrawn from the Extremities of its Blood-Veſſels; and in a little Time became Stagnant in their larger Branches.

This Appearance of the Continuation of the Extremities of the Arteries with the Veins, while the Blood was moving in them, in the *Caul* is expreſs'd by *Fig.* 4. *A, A.* ſhews the Trunks of the Arteries; *B, B.* the Veins, which were diſtinguiſhable by contrary Currents of the Globules of the Blood in each Veſſel; *C, C, C.* ſhews the Branching of the Extremities of the *Arteries* and *Veins* that no longer aſſociate with each other, but are united as here expreſs'd. After I had ſeen this, I attempted to ſhow the like to ſeveral Friends, but it did not always ſucceed ſo well, as when Mr. *Chambers* and Mr. *Buckeridge* favour'd me with their Preſence, at a Time when I happen'd to have a young lean Dog, that was not large, in

whoſe *Omentum* we ſaw it very well; but by the Aſſiſtance of an Inſtrument I had prepar'd to expand the *Meſentery*, we all ſaw it there much better; that Part having not only larger and clearer Spaces than the *Omentum*, but its Blood-Veſſels are diſtributed more regular, as appears by *Fig.* 5. where the ſame Letters of Reference ſerve as above.

Thoſe who will entertain themſelves in viewing the tranſparent Parts of living Creatures with *Microſcopes*, will find that the Extremities of their *Arteries* and *Veins* are not equally leſſen'd, tho' united. In the Tail of the *Lacerta aquatica*, *Tadpols*, and in moſt Fiſh I have examin'd, I have frequently obſerv'd ſeveral Communications between the *Arteries* and *Veins*; in which more than two Globules of Blood have paſt a-breaſt: And in the ſame *Area*, I have ſeen ſome of thoſe Communications ſo ſmall, as that but one Globule could paſs, and that very ſlowly before the other. In young *Fiſh*, particularly in *Grigs*, I have frequently obſerv'd a *Communicant Branch* ſo very ſmall, as that one Globule of Blood only has paſs'd it in two or three Seconds of a Minute: At other times I have found conſiderable Intervals in paſſing of one Globule in ſuch a communicant Branch; even half a Minute, a whole Minute, and once in two or three Minutes, I have ſeen one Globule of Blood only paſs in a particular Tract.

The prompt paſſing of Liquors, injected by the *Splenick Arteries* to the *Veins*, ſhews the Communications between thoſe Veſſels are more open than the *Arteries* and *Veins* of other Parts. Liquors alſo injected into the pulmonick Arteries paſs to their Veins, tho' not altogether ſo freely as in the *Spleen*. On viewing the Extremities of the *Pulmonick* Blood-Veſſels in a living Frog, with my *Microſcope* I found their Communications much larger than thoſe that I had before ſeen in the Membrane between the Toes, and in the Feet of the ſame Creature. Nor can we reaſonably doubt of the like patent Communications of the *Arteries* and *Veins* of humane Lungs and thoſe of *Quadrupeds*, when we conſider the Blood of their Lungs muſt return to the Heart, in equal Time and Quantity with that of all the Parts of the Body beſides. Hence it appears, *Bronchial Blood-Veſſels*, firſt taken Notice by the accurate *Ruyſch* are abſolutely neceſſary, elſe the Parts of the Lungs could receive Nouriſhment; nor could the Glands of the *Bronchiæ* ſeparate their Liquor, they were ſupply'd with Blood from pulmonick Blood-Veſſels, which is quickly diſpatch'd thro' the Lungs.

On viewing the Membrane that is between the Toes of one of the hinder Feet of a living Frog, after I had frequently taken hold of the ſame Leg of that Creature to apply it to the Microſcope, I found the Membrane very tranſparent, and without any Motion of the Globules of the Blood in it, as if the Part had been dead; but while I was looking on it, it was, I confeſs, not a little entertaining, to ſee the Globules creep into it by Degrees, and at length the Blood move in all the Branches of its *Veins* and *Arteries* as before, when no violence had been offer'd to the Part: While the Blood is leiſurely creeping thro' the Veſſels, you may plainly ſee its Globules compreſs'd into oval Figures, which are made more or leſs oblong by the Reſiſtance they Globules meet with, by the Contraction of the Sides of the Veſſels they paſs through; and this I have more than once obſerv'd in the Tails of the *Water-Newts* or *Lizards*. But on examining the Blood of thoſe Creatures with a Microſcope, and comparing it with the humane Blood, I found the Globules of the *Lizard's* Blood more inclining to an oval Figure, and were as big again as the Globules of humane Blood, and that in a ſmall Fiſh, which I in like manner view'd at the ſame Time. It is not unlikely, a ſudden Retroceſſion of Blood from the Extremities of its Veſſels often happens, and its Circulation in the ſame Veſſels afterwards carried on without any Impediment; as on ſome Paſſions of the Mind, *Deliquiums* by the Effuſion of Blood, or otherwiſe: But if the Blood is once become ſtagnant in its Veſſels, eſpecially the *Arteries*, the Part is in no ſmall Danger of a Mortification, unleſs its neighbouring Veſſels which enjoy the Motion of the Blood, diſcharge on the ſtagnant Blood, and it eſcape by the Sides of the Veſſels that retain'd it. Experience aſſures us, that in Bruiſes, when the Blo

Blood is extravaſated, it goes off either by Tranſcolation, or elſe cauſes an *Abſceſs*; for there's little Reaſon, in my Opinion, to ſuſpect any of the ſtagnant Globules of the Blood will be fit to re-unite with the circulating Maſs. But that the Blood, after Stagnation in its Veſſels, will ſometimes paſs their Sides, appear'd to me from the following Experiment.

On viewing the *Meſentery* of a Dog, when living, in which I had before ſeen the Blood paſſing the Extremities of the *Arteries* and *Veins*, I conſider'd how to preſerve the Blood in its Veſſels, that I might afterwards at any Time ſee it in their Extremities when ſtagnant: For this End I caus'd ſeveral Parts of the *Meſentery* to be tied on as many Pieces of ſmall round Pill-Boxes, cut tranſverſely like little Hoops, on which Portions of the *Meſentery* were extended like the Head of a Drum; and on viewing them afterwards with my Microſcope, I found the Extremities and Branches of the Blood-Veſſels charg'd with Blood, which before appear'd in Motion; ſome of which Parts of the *Meſentery* I ſtill keep by me. On laying one of theſe Parts of the *Meſentery* thus expanded in Water, the ſtagnant Blood in its Veſſels diſappear'd; but on juſt immerſing another of thoſe Pieces in Water, I could with my naked Eye ſee the ſtagnant Blood diffus'd in the Interſtices of the Blood-Veſſels, and between the Membranes of the *Meſentery*: Hence it's evident, the Blood may paſs the Sides of its Veſſels, after Stagnation in them; but whether its Globules are broken, or what Figure renders them fit to paſs thoſe Pores that are in the Sides of the Veſſels, I leave to the Inquiſitive: But we muſt return to our *Tables*, and firſt of that of the Syſtem of the *Vena Cava*.

As the *Arteries* are known to export the Blood, ſo the *Veins* carry it back again to the Heart; but having already deſcrib'd their Extremities, we come next to the large Trunks of the Veins; and here, as in the Arteries, we find the common Practice of Nature, in diſpoſing the Branches of Veins to diſcharge the refluent Blood into the next adjacent Trunk, and ſo on to the Heart. As the Arteries afford abundance of Inſtances of Checks given to the Velocity of the Current of the Blood through ſeveral Parts, ſo the Veins ſupply us with as many Artifices to aſſiſt its regular Return to the Heart, as well as favour thoſe Contrivances in the Arteries.

The Trunks of the *Carotide*, *Vertebral* and *Splenick Arteries*, are not only variouſly contorted, but are alſo here and there dilated; ſo the *Veins* that correſpond to thoſe *Arteries* are alſo variouſly dilated, the Beginnings of the internal Jugulars have a bulbous Cavity, *Fig.* VII. *H, H.* which are *Diverticuli* to the refluent Blood in the *Sinus's* of the *Dura Mater*, leſt it ſhould deſcend too faſt into the Jugulars. The like has been alſo taken Notice of by Dr. *Lower* in the *Vertebral Sinus's*. The *Splenick Vein* has divers Cells opening into it, near its Extremities, in humane Bodies; but in *Quadrupeds*, the Cells open into the Trunks of their *Splenick Veins*. The *Spermatick Veins* do more than equal the Length of the *Arteries* of the *Teſtes* in Men; their various Diviſions and ſeveral Inoſculations, and their Valves, are admirably contriv'd to ſuſpend the Weight of the Blood, in order to diſcharge it into the larger Trunks of the *Veins*; and were it not that the refluent Blood from the *Teſtes* is a *Pondus* to the influent Blood from the *Arteries*, and ſtill leſſens its Current from the *Teſtes*; theſe *Spermatick Veins*, like thoſe of other Parts, might have diſcharg'd their Blood into the next adjacent Trunk.

Who can avoid Surprize at the Art of Nature, in contriving the Veins that bring Part of the refluent Blood from the lower Parts of the Body, when they conſider the Neceſſity of placing the humane Heart, as well as that of moſt *Quadrupeds*, ſo far from the Center of the Body towards its upper Part? It is for that End neceſſary the large Trunks of the *Veins* and *Arteries* ſhould not aſſociate each other. See *Lower* of the Heart, *Chap.* I. *Page* 1. for if all the Blood ſent to the lower Parts, by the deſcending Trunk of the *Aorta*, ſhould return to the Heart again by one ſingle Trunk, as it is ſent out from thence, the Weight of ſo much Blood in the aſcending Trunk of the *Vena cava*, *Fig.* VI. *C, C, A.* for ſo its lower Trunk is call'd, would oppoſe the Form the Heart could give it from

the Arteries, and hinder its Aſcent: For this Reaſon the *Vena Azygos*, *Fig.* VI. *b.* or *ſine Pari*, is contrived to convey the Blood ſent to the Muſcles of the Back and *Thorax*, into the deſcending Trunk of the *Vena cava*, *ib. B*, *A.* above the Heart: Hence its Evident, more Blood comes into the Heart by the deſcending or upper Trunk of the *Vena cava*, *ib. B*, *A.* that paſſes out by the aſcending Trunk of the *Aorta.* Nor does this Quantity of Blood convey'd to the Heart by the ſuperior Trunk of the *Cava*, ſeem without ſome other Deſign in Nature; beſides transporting it thither to free the inferior Trunk from its Weight: But perhaps it was neceſſary ſo much Blood ſhould be ready there to join with the Chyle, *Fig.* VI. for its better Mixture, before it reaches the right Auricle of the Heart.

The EXPLICATIONS of the FIGURES.

Fig. I. *Repreſents the Trunks and large Branches of the* Arteries *diſſected from an Adult Humane Body, when diſplay'd and dry'd; as they are now to be ſeen in the Repoſitory of the Royal Society.*

1. The Trunk of the *Aorta* cut from the *Baſis* of the Heart.
2. That part of it, whence the *coronary Artery* of the Heart does ariſe.
3. That part of the *Arteria magna*, where the *Canalis Arterioſus* of the *Fœtus* terminates; which in an *Adult* becomes a Ligament.
4. That part of the *Axillary Arteries*, by ſome call'd the *Subclavians.*
5. The left *Carotide Artery*, in this Subject it ſeems ariſing from a common Trunk with the right *Carotide* and *Axillary Arteries*, as in ſome *Quadrupeds.*
6. The left *cervical Artery*, in this Subject ariſing from the Trunk of the *Arteria magna*, as expreſs'd in a Figure given by *Bergerus* in the *Acta Eruditorum*, *An.* 1698. *pag.* 295. But in all the humane Bodies, in which I have hitherto examined theſe *Arteries*, I have conſtantly found them as expreſs'd, *Fig.* II. 6, 6.
7. The *Arteries* that carry Blood to the lower Parts of the Face, Tongue, adjacent Muſcles and Glands.
8. The Trunk of the *Temporal Artery*, ſpringing from the *Carotide*, and parting with Branches to the parotide Gland: 9. And the Temples; 10. With the Parts adjacent.
11. The *occipital Arteries.*
12. The *Arteries* that convey Blood to the *Fauces*, *Gargareon*, and neighbouring Muſcles.
13. The Trunk of the *carotide Artery* cut off before it is contorted in paſſing the Skull.
14. The Trunk of the Artery of the Arm parting with Branches to the adjacent Muſcles and Parts.

* That Part of this Artery which is ſometimes prick'd in letting Blood, and makes an *Aneuriſm*, in which Caſe the Trunk of the Artery muſt be bared and firmly-tied above the *Aneuriſm*; and if it afterwards happens, as it has been frequently known, that the Flux of Blood to the *Aneuriſm* in the *Artery* is not very much abated, tho' the *Artery* has been tied above the Operator in that Caſe muſt make another Ligature on the Trunk of the *Artery* below its *Aneuriſm*: Theſe collateral Communications of the Trunk of the *Artery*, at the Bending of the *Cubit*, preſerve the Circulation of the Blood in the *Cubit* and Hand tho' the Trunk is totally compreſs'd both above and below; and the ſame Trunk afterwards divided between thoſe Ligatures. Hence it is, if one Ligature made above the Wound in the *Artery* is not ſufficient, but the Blood ſtill pours out from below, the Patient will ſooner recover the Action and Strength of the Muſcles of the *Cubit*, than thoſe who

Fig: 2

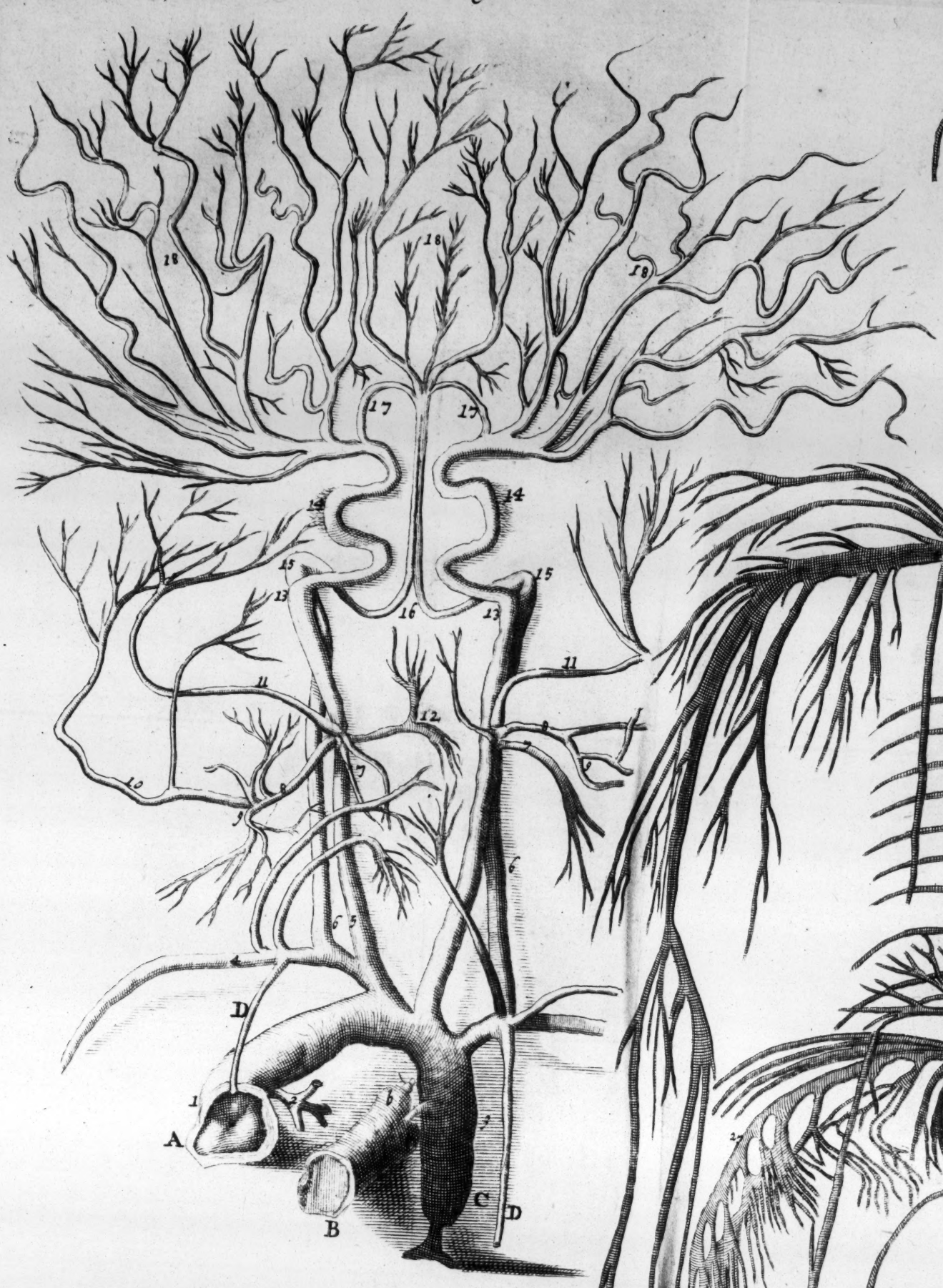

Fig: 4

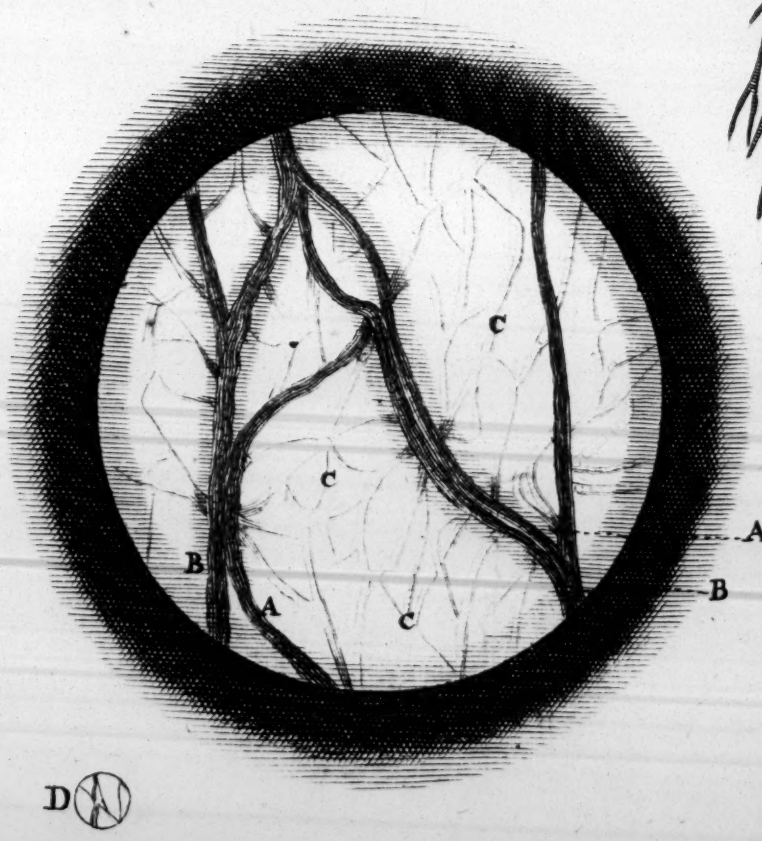

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Fig: 5

Vol 2 page 411

Fig: 1

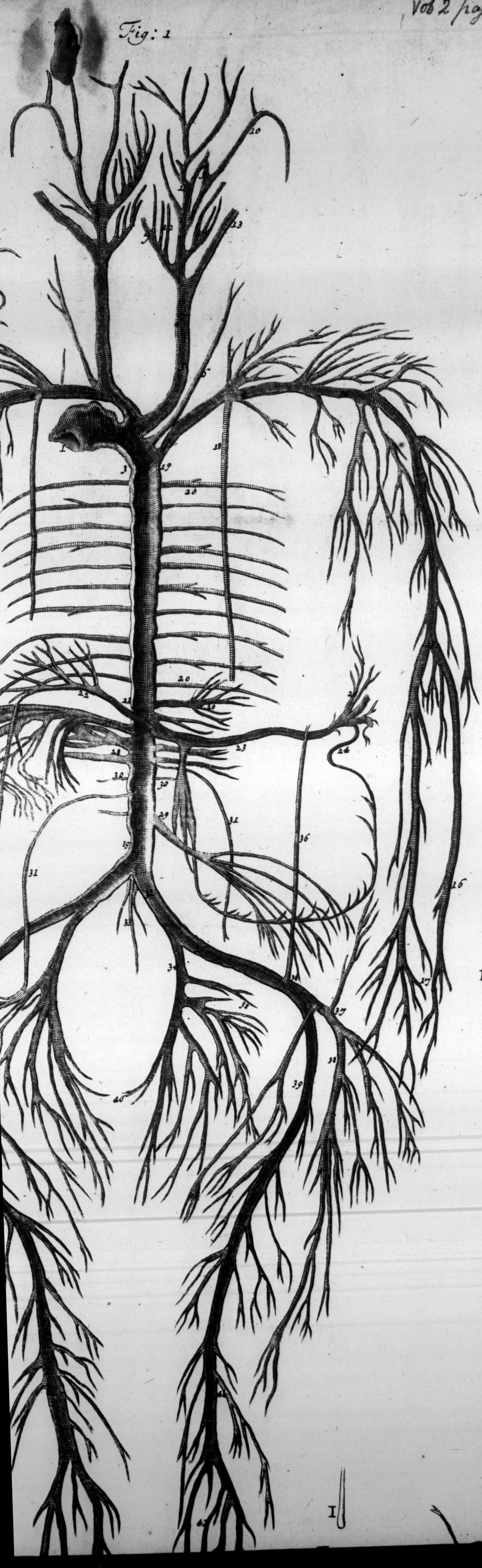

Fig: 3

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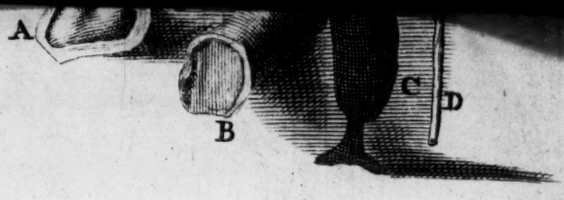

Fig: 4

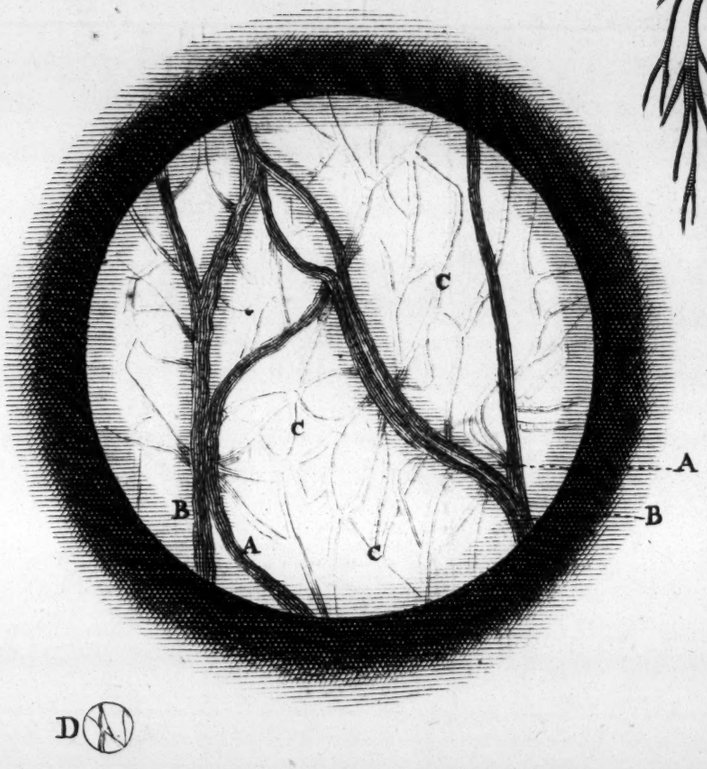

Fig: 5

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om the upper Ligature proves ſufficient; the Reaſon of which is obvious to any who conſider that the communicant Branches, as I have ſeen them in ſome Subjects, are here mark'd out in prick'd Lines. *See the* Fig.

Whilſt theſe Papers were lying by me, the Two following Inſtances happen'd, in which the Communications of the large Trunks of the Arteries of the *Cubit* and Arm were remarkable. The Firſt was a Boy of Thirteen Years of Age, who about three Weeks before I ſaw him, receiv'd a Wound near the Middle of the *Cubit*, in which the Trunk of the *Artery* mark'd in the *Fig.* †. was divided. The Surgeon who was firſt call'd, had frequently bound up the Wound, and put a Stop to ſeveral Diſcharges of Blood, which they told me did not amount to leſs than 6 or 7 Quarts at Times, but not without a Compreſs on the Trunk of the *Artery* above the Wound: On another impetuous Flux I was call'd; but ſeeing no ſmall Quantity of Blood diſcharg'd, I was contented to let the Wound be bound up, in the ſame Manner as it had been done before, omitting the Compreſs on the Trunk of the *Artery* above, and adding a Piece of Deal-Board, on which the Hand and Cubit were faſten'd to prevent any Motions on thoſe Parts as well as the Fingers. Three Days after, the Applications were taken off, and little or no Blood appear'd; but two or three Hours were ſcarce elaps'd, e're I was alarm'd with Notice of a freſh Flux: The By-ſtanders being inſtructed in that Caſe, to compreſs the Trunk of the *Artery* above the *Cubit*, they had thereby prevented no ſmall Effuſion of Blood, which muſt otherwiſe have happen'd. His Surgeon being out of the Way, I laid the Trunk of the *Artery* bare above the Wound, as expeditiouſly as I could, being forced more than once to let looſe the Compreſs above to diſcover its Orifice by the Flux of Blood. I paſs'd a Needle with ſtrong wax'd Thread under the *Artery*, and made a Ligature on its Trunk, which lay conceal'd in the Interſtice of the *Muſculus Flexor Digitorum*, and the *Muſculus Ulnaris Flexor Carpi*; but notwithſtanding this Ligature on the Trunk of the *Artery* above the Wound, the Blood ſtill flowed from the lower Trunk of the *divided Artery*, yet the Velocity of its Current was ſo much abated, that it ſeem'd like Blood flowing from a Vein. I left the Wound with a Digeſtive, and the Part without hard Bandage, it being now five Weeks ſince, I hear the Wound is almoſt cicatriz'd. The learned Dr. *Harris* was preſent at the other Operation, by which the *Communications* of the large Trunks of the *Arteries* of the Arm were very Evident.

A Boy of about Eight Years of Age, who came to Town with an *Aneuriſm* of the left Arm, upon Bleeding ſix Weeks before. The Tumour was indeed very large in Proportion to ſo ſmall an Arm: After laying the *Aneuriſm* or *Tumour* bare, and making a Ligature on the ſuperior Trunk of the Artery in the annex'd Figure *..... I found, on looſing the Compreſs on the ſuperior Trunk of the *Artery*, very little Abatement of the Pulſation of the *Aneuriſm*: I then paſs'd a Ligature in like manner on the Trunk of the *Artery* below the Tumour; but notwithſtanding that, the Pulſation continued, tho' much abated. I then diſcover'd another Trunk of the *Artery* ariſing from the lower Part of the *Tumour*, on which I alſo made another Ligature, and the *Pulſation* was then taken off. However, on cutting off the Surface of the *Cyſtis* or dilated *Artery*, and clearing it of the coagulated Blood, there ſtill poured out ſome freſh Blood, which was ſoon ſtop'd with a common Aſtringent; I left the Part without any other Ligature or hard Bandage. It is now eighteen Days ſince the Operation, the Ligatures on the Arteries are all come off, and the Pulſation of the *Artery* of the Wriſt begins to be very manifeſt, nor does any Symptom appear that threatens ill Succeſs.

15. The Diviſion of the Trunk of the *Artery* of the Arm, below the Flexure or bending at the *Cubit*.
16. The external *Artery* of the *Cubit*, which makes the *Pulſe* that is commonly felt near the *Carpus* or *Wriſt*.
17. The Arteries of the Hands and Fingers.
18. The mammary Artery.
19, 19. The deſcending Trunk of the *Arteria Magna*.
20, 20. The *Intercoſtal Arteries*.
21. The *Arteria Caliaca*.
22. The *Arteria Hepatica*.

23. The Trunk of the *Arteria Splenica.*
24. The *Arteria Epiploica Sinistra.*
25. A Branch of an Artery which passes to the Bottom of the Stomach.
26. The superior coronary Branch of the Stomach.
27, 27. The superior mesenterick Artery.
28. The emulgent Arteries.
29. The inferior mesenterick Artery.
30, 30. The lumbal Arteries.
31, 31. The two spermatick Arteries, which in this Subject seem to rise at a greater Distance from each other than commonly.
32. The Iliack Artery.
33. The *Arteria Sacra.*
34. The internal Iliack Branch.
35. The External ——
36. The Epigastrick Artery.
37. Branches of the external Iliack Artery passing to the oblique Muscles of the *Abdomen.*
38, 38. The Arteries that pass to the Muscles of the Thigh and *Tibia.*
39. The Crural Artery.
40. The Umbilical Artery, with those of the *Penis.*
41. That Part of the Crural Trunk that passes the Ham.
42. The three Trunks of the Arteries of the Leg.
43. The Arteries of the Foot and Toes.

Fig. II. *The Trunks and some of the Ramifications of the Arteries of an Adult Humane Body fill'd with Wax, to shew the Variety in Nature, and supply the Defects of the former Figure.*

1. The *Aorta* cut off at the *Basis* of the Heart.

A. The three semilunary Valves, as they appear when the Heart is in *Diastole*, and hinder the Blood coming back from the Arteries into the Left Ventricle of the Heart.

B. A Portion of the Trunk of the *Arteria Pulmonalis. b, b.* its Division before it passes to the Right and Left Lobes of the Lungs.

C. The descending Trunk of the *Arteria Magna.*

D, D. The internal Mamillary Arteries.

2. The Trunk of the Coronary Artery cut off.

3. The *Ligamentum Arteriosum*, which in the *Fœtus* is the *Canalis Arteriosus*, and conveys Blood from the *Pulmonick Artery* to the great Artery.

4. The Trunk of the *Subclavian Artery.*

5, 5. The *Carotides.*

6, 6. The Vertebrals.

7, 7. The Arteries which pass to the lower Parts of the Face, Tongue, adjacent Muscles and Glands.

8, 8. The Trunks of the temporal Arteries arising from the *Carotides*, giving Branches to the *Parotide Glands*, 9, 9. And the Temples, 10, 10, *&c.*

11, 11. The Occipital Arteries.

12, 12. The Arteries of the *Fauces*, *Gargareon*, *&c.*

13, 13. The Contortions of the *Carotide Arteries*, as they pass the *Basis* of the Skull. These Trunks of the *carotide Arteries* in Dogs, like those I guess of most *Quadrupeds*, are very much contorted before they reach the *Basis* of the Skull: On filling these Vessels of that Animal with Wax I found those Branches of them which pass to the Brain, first clipping the hinder Part of the lower Jaw, immediately under its Condiloide Processes, where those Arteries are received into two *Sinus's* of that Bone, which *Sinus's* may also be seen in the Jaw-Bones of other *Quadrupeds*, but not in humane Bodies.

14, 14. Those Parts of their Trunks that pass by each Side of the *Sella Turcica*, whence divers small Branches arise and help to compose the *Rete Mirabile*, which is more conspicuous in *Quadrupeds* than in humane Bodies.

15, 15. The Contortions of the vertebral Arteries, where we find their Trunks considerably dilated.

16. The vertebral Arteries, as they ascend on the *Medulla Oblongata*, towards the annular Protuberance or *Pons Varolii.*

17, 17. C

Fig: 7

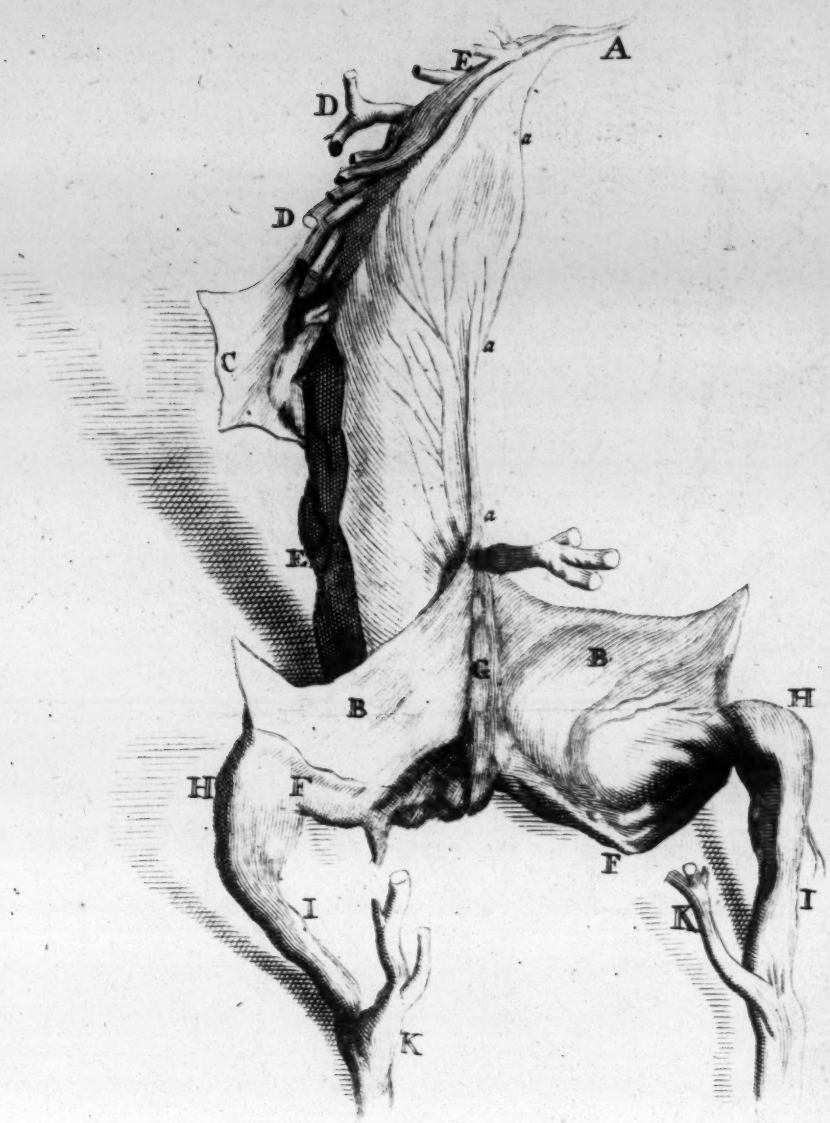


Fig: 8

Vol 2 page 413

Fig: 6

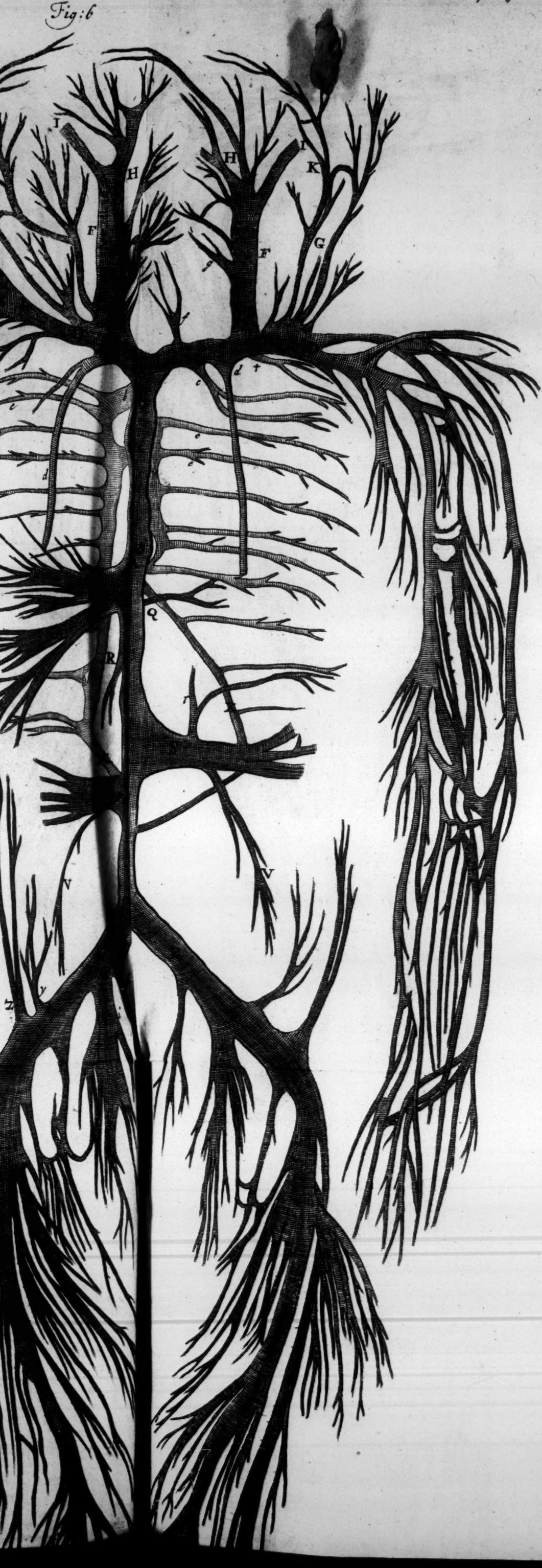
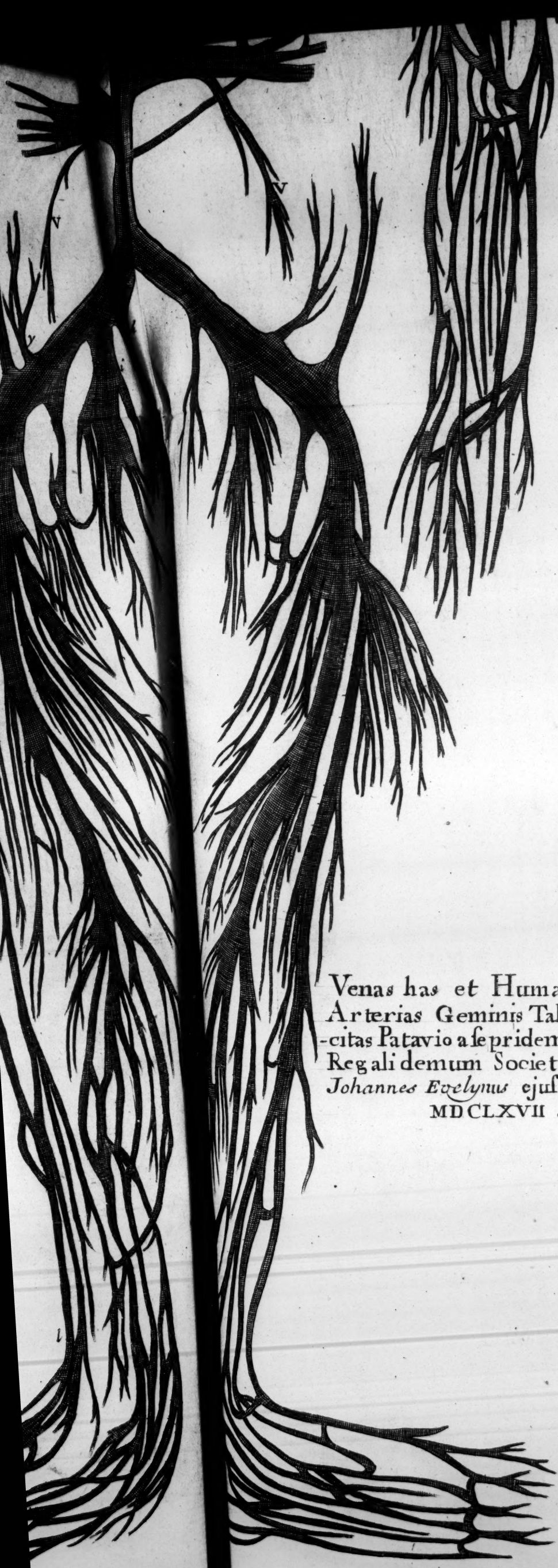


Fig: 8



Venas has et Humani Corporis
Arterias Geminis Tabulis adpli-
-citas Patavio a se pridem deductas
Regali demum Societati dedit
Johannes Evelynus ejusdem Socius
MDCLXVII .

17, 17. Communicant Branches of the vertebral and *carotide Arteries.*

18, 18. The Arteries of the Brain diſplayed.

Fig. III. *I chooſe to place this Figure on the Copper-Plate of one of the Trunks of the* Arteries *of the* Tibia, *diſſected from the Leg after Amputation, rather than the following Diſtich, which I find written on the original Table of this Scheme of the* Arteries.

Fœſificus Sanguis de Cordis Ventre ſiniſtro,
Funditur ut Corpus nutriat hiſce Viis.

Before I explain the Letters of Reference of this third Figure, it will be neceſſary to let you know that Mr. *Stringer* was in his Sixty-ſeventh Year when this Artery was taken from him, and near twenty Years before loſt the Uſe of both his Legs; and in that Time he had been ſo perſecuted with *Convulſions* in them, that neither Leg was free a quarter of an Hour together, whether Sleeping or Waking. At length, one of his little Toes mortified, which was taken off by Mr. *Goldwyer*, an expert Surgeon of *Salisbury*; not long after, more Toes of the ſame Foot followed the ſame Fate: The *Convulſions* purſuing ſtronger and quicker, that Part of the Foot next the Toes became tumid and inflam'd, the Tumour extending it ſelf above the *Malleoli*. A *Sinuous Ulcer* paſſed by the Side of one of the *Metatarſal Bones*, the Extremity of which Bone, whence the Toe was taken off, lying bare. In this Condition I found the Left Foot and Leg of this Gentleman, when I had the Honour to wait on him by Command of the Right Honourable the preſent Earl of *Shaftsbury*, he living in the Neighbourhood of that Noble Peer in *Wiltſhire*, where I met with Mr. *Goldwyer* above-mention'd, and finding the Leg very chilly, the Neceſſity of parting with it was too Evident; which Mr. *Stringer* ſuffer'd with extraordinary Fortitude, he not ſo much as expreſſing the leaſt Outcry during the Operation, tho' the Part did not want the moſt exquiſite Senſe of Feeling: On the Abſciſſion, which was about five or ſix Inches below the Knee, it was unexpected by me, I muſt confeſs, to ſee ſo little Blood ſpouting from the Arteries. The Stump being bound up, and committed to the Hands of two or three Servants, a leſs Number not being ſufficient to hold it, by reaſon ſuch ſtrong convulſive Motions purſued the Part on the Operation; I was very deſirous to examine the Arteries of the amputated Leg, having before diſcover'd the Cauſe of a Mortification of the Arm of a young Gentlewoman, who died not long after an Amputation of the Part, tho' the *Gangrene* did not appear to reach near the Place where the Abſciſſion was made; that is below the Ending of the *Muſculus Deltoides*, in which Caſe I found the Sides of the Trunk of the Artery of the Arm ſo thicken'd, that the Diameter of its *Bore* was contracted to leſs than a third Part, and would ſcarce admit a common Probe to paſs it, *vid. Fig. G, H, I.* when I had found the Ends of the Arteries in the Leg above-mention'd, I endeavour'd to paſs my Probe into one of them, but meeting with ſome Oppoſition, I ſuſpected I had miſtaken the Vein for the *Artery*, and that the Valves oppos'd the Paſſing of the Probe that Way; but on further Diſſection, I clear'd the Trunks of both theſe Veſſels and found the *Veins* in their natural State, but the Sides of the *Arteries* were grown bony or ſtony; having clear'd two of their Trunks, I left one of them at *Salisbury*, the other I brought to Town, and is here figur'd.

A. The upper Part of the Artery cut off in the *Amputation* of the Leg; from *A.* to
B. The Trunk of the Artery diſtended and dry'd to ſhew its *Canal.*
C. That Part of the Trunk of the Artery which was ſo contracted by the Petrification or Oſſification, that a Probe would not paſs its Canal; from *C.* to
D. The Trunk of the Artery open'd and expanded.
E, E. The Petrifications, *&c.* in the Sides of the Artery.

F, F. Their

F, F. Their Specks in the lower Part of the Artery, not ſo large as in the upper Part, and plac'd at greater Diſtances.

G. A Portion of the Trunk of the Artery of the Arm above-mentioned.

H. The Sides of the Artery very much thickned, whereby the *Diameter* of its *Canalis* was ſo much diminiſh'd, that the Probe

I. Would not paſs it.

The Oſſifications in the Coats of Arteries have been frequently obſerv'd, eſpecially in their large Trunks within the Cavities of the *Thorax* and *Abdomen*; but I don't remember the like has been taken Notice of in the Limbs; or that ſuch Impediments in their Canals have been found the Cauſe of Mortifications of particular Parts, as in th Inſtance above-mentioned; tho' I doubt no but the like has often happen'd in aged Pe ple, eſpecially where we find the Progre of the *Gangrene* not very ſwift, and its B ginning from no external Cauſe; the Con ſequences of which are commonly found fa tal: When the Arteries of one Leg, or o any other Limb, are ſo affected, we ma well ſuſpect the like in thoſe of other Parts which probably happen'd in the Inſtance now mentioned; for tho' no *Gangrene* came on the Stump, yet the other Foot and Toes began to mortify about ſix Weeks after the Amputation; as did the Parts about the Hips, which were compreſs'd in Laying or Sitting, before he expired.

Fig. IV. *Repreſents the Extremities of the Blood-Veſſels, while the Blood is paſſing them in the* Omentum *or Caul of a live Dog, view'd with a Microſcope.*

A, A. The Branches of Arteries.

B, B. The Veins which aſſociate.

C, C. Their leſſer Branches where they paſs from each other, and are united at their Extremities.

Fig. V. *The like appearing in the Meſentery of a Dog when living.*

D, D. The *Areæ* that are here view'd with the Microſcope, as they appear to the naked Eye.

Fig. VI. *The Trunks of the* Vena Cava *with their Branches diſſected, from an Adult Humane Body; done from the original Scheme in the Repoſitory of the Royal Society.*

A, A. The Orifice of the *Vena Cava*, as it appears when cut from the Right Auricle of the Heart.

a. The Orifice of the coronary Vein of the Heart.

B, A. The ſuperior or deſcending Trunk of the *Vena Cava.*

C, C, A. The inferior or aſcending Trunk: So diſtinguiſh'd from the Motion of the Blood in theſe Trunks, which is contrary to their Poſition.

D, D. The *Subclavian Veins.*

†. That Part of the left *Subclavian Vein*, where the *Thoratick Duct* enters it, and diſcharges it ſelf of its *Chyle* and *Lympha.*

b. The *Vena Azygos*, with its Branches going to the Ribs, *e, e.*

c. The ſuperior intercoſtal Veins.

d, d. The internal Mammary Veins.

E, E. The right Iliack Branches.

F, F. The internal Jugular Veins.

G, G. The external Jugulars.

H, H. The Veins which bring Blood from the lower Jaw and its Muſcles.

I, I. The Trunks of the internal Jugulars cut off at the *Baſis* of the Skull.

f. The Veins of the *Thymus* and the *Mediaſtinum.*

g, g. The Veins of the *Thyroid Glands.*

h. The *Vena Sacra.*

a. The internal *Iliack Branch.*
b. The External ——
K, K. The *Occipital Veins.*
L. The right *Axillary Vein.*
M. The *Cephalick.*
N. The *Baſilick.*
O. The *Median Vein.*
P. The Trunk of the Veins of the Liver.
Q. The *Phrenick Vein* of the Left Side.
R. The right *Phrenick Vein.*
r. A large Vein from the left *Glandula Renalis* and Parts adjacent.
S. The left *Emulgent Vein.*
T. The right Emulgent, in this Subject very much lower than the Left, which is not uſual.
V, V. The two *Spermatick Veins.*
X, X. Two communicant Branches between the aſcending Trunk of the *Vena Cava* and *Vena Azygos*, by which the Wind paſſes into the deſcending Trunk of the *Cava*, when we blow into the aſcending at *A, P, C.* tho' the Trunk at *A, P,* and *C.* is firmly tied on the Blow-Pipe.
* An uncommon Branch between the lower Trunk of the *Vena Cava*, and the left *Emulgent Vein.*
Y. A Vein which brings Blood from the Muſcles of the *Abdomen* into the external *Iliack Branch.*
Z. The *Epigaſtrick Vein* of the right Side.
1. The *Vena Saphæna.*

The reſt of the Branches here diſplay'd, commonly differ ſo much in various Subjects, that the particular Deſcriptions of them, which none but the Operator who diſſected them could pretend to be Maſter of, would perhaps be as uſeleſs as tedious to repeat: Wherefore I paſs to thoſe conſiderable venous Trunks which are wanting in this Scheme.

Fig. VII. *Some of the large Trunks of the* Veins, *and their* Sinus's *within the Skull, with the Beginnings of the internal* Jugular Veins *fill'd with Wax, and dry'd together with the* Falx, &c.

d. The Extremity of the *Falx* cut from the *Criſta Galli.*
a. Its lower *Limbus* that touched the *Corpus Calloſum*, as it divides the right Hemiſphere of the Brain from the Left, where the fifth *Sinus* paſſes, which is here dry'd and diſappears.
B, B. The ſecond Proceſs of the *Dura Mater* which ſupported the hindmoſt Parts of the Lobes of the Brain, and defended the *Cerebellum* from being preſs'd by thoſe Parts of the *Cerebrum.*
C. A Portion of the *Dura Mater* remaining to the *Longitudinal Sinus.*
E, E. The *Longitudinal Sinus's.*
F, F. The two lateral *Sinus's.*
G. The fourth *Sinus.*
g. The Veins from the *Plexus Coroides.*
H, H. The *Bulbi* or *Diverticuli*, at the Beginnings of the internal Jugular Veins.
I, I. The internal Jugular Veins.
K, K. The Trunks of the Veins, which bring Blood from the lower Jaw and Parts adjacent.

Fig. VIII. *The Trunks of the* Vena Portæ *diſſected and diſplay'd; done from the original Scheme in the Repoſitory of the Royal Society.*

A, A. The Branches of the *Vena Portæ* freed from the Liver.
B. The Umbilical Vein.
C. The Splenick Branch.
C. The Meſenterick Branches, which are continued from the Inteſtines.
D. The Trunk of the *Vena Pancreatica*, which receives Branches alſo from the *Duodenum.*
c, c. The *Vena Gaſtrica dextra Coronaria Superior.*
D. The ſuperior Coronary Vein of the Stomach of the left Side.
E. The inferior Coronary Branch of the Stomach of the right Side, *&c.*
F. The ſame Coronary Vein of the left Side removed from their proper Situations; from theſe two laſt, are continued the *Ve-*

na

na Epiploica ſuperior Dextra, 1. and the *Siniſtra*, 2. with the *Media*, 3.

G. The Vein call'd *Vas Breve.*

d. The *Vena Duodeni.*

H. The *Vena Hæmorrhoidalis* ariſing from the *Rectus* and *Anus*, in this Subject emptying it ſelf into the left *Meſenterick Branch*; but in other Bodies, and particularly in a Preparation of theſe Veins, which I have now by me, I find this Trunk of the *Hæmorrhoide Veins* ending in the *Ramus Splenicus.*

The Length of the Trunk of this *Hæmorrhoide Vein*, and its Progreſs under the Inteſtines, renders it liable to be compreſs'd, and its refluent Blood retarded; whence its Branches in the *Inteſtinum Rectum* and *Anus* become diſtended with Blood, and cauſe the *Hæmorrhoidæ Cæcæ* and *Apertæ*, which are frequently attended with *Apoſtumations* in the *Anus* and Parts adjacent; which Diſorders are more incident, not only becauſe theſe *Hæmorrhoide Veins*, like the reſt of t Branches of the *Vena Portæ*, are witho *Valves*, and the Blood has an aſcending P greſs in them together, that the long Tru *H.* is not only expos'd to the Compreſſio made by the Inteſtines in both Sexes; b particularly the *Uterus* in Women in ti of Geſtation, eſpecially near the Birth, Compreſſes this Trunk, that it is no Wo der we find Women more afflicted with th *Hæmorrhoides* at that Time more than at an other: Nor are the *Iliack Veins* and the *Lyphedu&t* that accompany them, without being expos'd to the like Incumbrance in Women with Child; whence the Veins of the Legs and Thighs become *Varicoſe*, and thoſe Limbs are ſo frequently ſwoln; which in a late Inſtance I was acquainted with, when the Intumeſcence prov'd ſo great, that at length the *abdominal Teguments* were vaſtly extended; but the Gentlewoman recovered beyond the Expectation of ſome, on the happy *Delivery* of two large Children.

Of the Wounds of the Nerves, &c. *From Mr.* Wiſeman, *and others.*

NErves may be wounded ſeveral Ways, *viz.* either by Sciſſion or Puncture. In the former Way they are uſually cut thro', and then there is no Occaſion for any new Conſideration in Surgery, becauſe their Action totally ceaſes, and they are quite irrecoverable. But the Puncture, that is, when they are prick'd by ſome ſharp pointed Weapon, deſerves our particular Conſideration. In the ſame Manner the Tendons, not the ſmall Fibres of them, which are in every Wound of the carneous or fleſhy Parts, but the main Body of them, which uſually make up either the Tail or the Head of a Muſcle.

If you deſire to be ſatisfied whether theſe are wounded or not: Take the Place into your ſerious Conſideration, to wit, whether near the Joint, in the Inſide of the Arm or Leg, or the End of the Muſcle or the tendinous Parts of the Hand or of the Feet. The Symptoms are, great Pain, and Inflammation, as likewiſe a Contraction and Hardneſs in the Nerve or Tendon: But if the Nerve be wounded by Sciſſion, that is, when it is quite divided, the Pain is inconſiderable, but there is a Kind of Stupor or Numbneſs; and according as the Nerve is more or leſs conſiderable, the particular Part is depriv'd more or leſs of the Motion.

The Punctures being the moſt frequent Wounds of Nerves, and ſuch as moſt require the Aſſiſtance of the Surgeon; I ſhall Inſtance in them, and chuſe the moſt Common, *viz.* thoſe which are made accidentally by letting Blood: And here by the Way it is worth our Obſervation, that in Veneſection, the Apertion happens ſometimes

times to be made, when the Skin by reaſon of the Bandage or Poſition of the Arm, lies equal with the Vein, and yet proves not to be ſo afterwards, or ſometimes this Opening is made too ſmall in the Skin; ſo that Part of the Blood being choak'd in, remains there extravaſated, and cauſes a ſmall *Phlegmon*. It may happen alſo in ſome that are let Blood very well, that nevertheleſs, thro' the ill Diſpoſition or Habit of Body, the Part that is prick'd Feſters, as they call it, groweth ſore within a Day or two after, and if not taken Care of, will raiſe a Tumour, which lying upon the Nerve or Tendon, may at that Time contract the Arm; for if we do but conſider how painful a Boil is in the fleſhy Part, we may eaſily conclude, that it muſt be much more ſo in the Joints, among the Nerves and the Tendons. Theſe being ſuch Accidents as will happen, even to the moſt expert Surgeons in letting Blood. Hence it is, that ſome of our old experienc'd ones did always, after Veneſection, apply a Pledget of *Baſilicon* upon the Aperture, with *Empl. Diacalcit.* over it, which by its digeſtive Quality, was to ſecure it from corrupting; but we take a quite contrary Way, for by a little Compreſs dip'd in Water, we endeavour to check the Flowing of the hot *Serum* to the Orifice.

Moſt People, when they have recourſe to Veneſection, do either labour under ſome extraordinary Fermentation, or at leaſt apprehend that they do; and what Wonder is it, if ſometimes it fall upon the Part where the Aperture was made, and whither it is invited by the Bandage. I was once ſent for into the Country to one, who after *Phlebotomy* was afflicted with a bileous Inflammation or *Eryſipelas*, the whole Length of his Arm: The Apertion made in the Vein, might in all probability be the Occaſion of it, and yet the Place it ſelf was not afflicted; for a Man muſt be either very Ignorant or Malicious, to impute ſuch Accidents to a Puncture of the nervous Tendon. For when the Nerves or Tendons are really prick'd, their Symptoms make a ſudden Appearance, with violent Pain, Faintings, Convulſions, and are attended with exceſſive Effluxions: Neither do they terminate preſently in a Suppuration, but gleet, and will not yield to a ſimple Anodine Cataplaſm of white Bread and Milk.

All Wounds of the Nerves and Tendons are dangerous, but are accounted more or leſs ſo, according as they are of Uſe. Thoſe of the Nerves are attended with the moſt pernicious Symptoms, and ſeize the Patient more ſuddenly: But whether it be Nerve or Tendon, the tranſverſe Wounds are the moſt Dangerous, and the moſt Difficult to to be cured: Their Cure requires divers Conſiderations; and in the firſt Place, whether the Nerve or Tendon lie in View, or under Coverture of the Skin; if they lie under the Skin or under the adipoſe Membrane, you muſt open the Skin, to open a Way to the Medicines to penetrate to the wounded Nerve or Tendon. Your Remedies muſt be ſuch as are of hot, dry and ſubtle Parts to conſume that *Ichorous Liquor* that firſt affects them, and cauſes Putrefaction.

In the Beginning you may uſe Oil of Roſes with a little Bay-Salt, diſſolv'd and drop'd into the Part ſcalding hot, upon which you may apply a Pledget ſpread with *Baſilicon* dip'd in the ſame, and embrocate the circumjacent Part with Oil of Earthworms, and a Bole Plaiſter over it. If there be great Tumours and Inflammations, you may apply the following Cataplaſm: Take Barley-Meal, Bean-Flower, of each four Ounces; Linſeed and Fenugreek Powder, of each one Ounce; Red-Roſe, Camomil, Elder-Flowers and Tops of Wormwood, of each three Drams; boil theſe in Wine or common *Lixivium*, and add to it three Ounces of Oxymel and one of Oil of Roſes, and ſo roll up the Part gently. If there be violent Pain, you muſt dreſs it twice a Day; and if the Part requires Remedies of more drying and penetrating Parts, dreſs with Baſſam of Sulphur terebinthinated; or elſe, Take Oil of Savine and Turpentine, two Drams; or Oil of Savine, Rue, Caſtor or Scorpions. Theſe are the Remedies that are accounted moſt proper to dreſs theſe Wounds with; but the Oil of Roſes and Salt have always anſwer'd my Expectation.

In the Uſe of theſe Remedies you muſt make an exact Obſervation, what Degrees of Heat or Dryneſs may be moſt proportionable

tionable or proper to the affected Nerve or Tendon; for in caſe, during the Uſe of theſe Remedies, your Patient is not ſenſible of the Heat of them, or elſe feels it to an exceſſive Degree, you have not then well adapted them for your preſent Purpoſe; for in the former Caſe, they are not ſufficient to dry that *Sanies*, and in the Latter they may inflame the Part; but if the Patient feel the Heat in a moderate Degree, then you have hit the Point; but if after the Application of your Remedies, the Part itch and ſmart, and the Aperture made by the Puncture gape, you may then conclude, with good Reaſon, that they are too ſtrong; if the Hardneſs and Contraction do abate, and the Lips of the Wound relax, 'tis a good Sign. I will give you one Inſtance of this Kind, for your better Information.

A Maid being let Blood by a young Surgeon, he accidentally prick'd a Tendon near the Ankle, the *Phlebotomy* being adminiſtred in the *Saphæna*, he dreſs'd it up with Oil of *Turpentine* hot; but the Pain increaſing, I was conſulted, and found the Surgeon juſt ready to apply his hot Oils again: When I look'd upon the Wound, I found turgid and dry, and the adjacent Parts ſeiz'd with an Inflammation, ſo I ſhow'd him his Error, and it was dreſs'd with *Unguent. Baſilicon* warm, and he embrocated it with Oil of Roſes, and apply'd the *Diapalma* Plaiſter malaxed with ſome of the ſame Oil. It was not dreſs'd again in two or three Days, and in that Time the Patient was cured, whereas the continuing the Uſe of the hot Oils wou'd have prov'd very Miſchievous.

But if they will not yield to theſe, or ſuch like other Remedies as have been preſcrib'd, the only Way is to divide them, in order to prevent worſe Symptoms, *viz.* Convulſions, Spaſms, Gangrenes, *&c.* After which, you muſt proceed with them as in the Cure of other Wounds; only they require more Care in the Poſition and keeping the Member ſteady, in caſe it happen to be in ſuch a Joint, where there are Nerves and Tendons that move contrariwiſe.

The Cure of the Ligaments is perform'd much after the ſame Method with that of the Tendons, excepting that they require more drying Remedies, as *Euphorbium*, Sulphur *Vive*, *Calx*, Tutty, *&c.* A Youth of about ten Years of Age in a Fright happening to fall, was unfortunately catch'd by a ſharp-pointed Iron Spike in the Middle of his Wriſt, the Spike paſſing between the Bone and Tendons. I was ſent for, and found the Tendons ſtretch'd out to a great Length, ſome of them broken and torn in Pieces, and one of the Bones of the *Carpus* lying looſe in the Wound; this I took out, and after I had cleans'd the Wound, placed the ſhatter'd and over-ſtretch'd Tendons within it, and made my firſt Stitch in the Middle, and brought the Lips as cloſe together as I was able: Then I made two Stitches more, to wit, on each Side one, and dreſs'd him up with a Digeſtive of Turpentine, *&c.* dip'd in this following Balſam.

Take Turpentine, two Pounds; Oil Olive, three; Oil of Bay, four Ounces; Bark of the Cinnamon, three Ounces; *Euphorbium*, Cloves, Juniper-Berries, of each an Ounce; Gum-Ivy, *Sagapenum Ammoniacum*, *Opopanax*, *Galbanum*, of each one Ounce and a half; Myrrh, Maſtich, Colophony, of each in Powder three Ounces; diſtil them for Uſe. Over this, I apply'd the Emplaiſter of Bole, with a Compreſs dip'd in *Oxycrate*, and ſo roll'd up the Member. Some Hours after I adminiſtred Veneſection, and in order to procure him ſome Reſt, order'd him a Draught of Cowſlip-water, with Syrup of *Diacodium* and Cordial-water, but notwithſtanding, he reſted very ill that Night, and was full of Pain in the Morning.

I then took off the Bandage and bath'd the affected Member with a Decoction of Marſh-Mallows, Violets, Camomil, Vervain, Henbane, and over the Dreſſing I apply'd a Cataplaſm of Barley and Bean-Flower, Red-Roſes and Balauſtians boil'd in Oxymel, with the Addition of Oil of Roſes and Earth-worms. The next Day his Pain was much allay'd, the Tendons all drawn up, and the Stitches looſe; I then was for trying whether I could draw the Lips cloſe, but they were too full of Pain to admit of it, therefore I cut out the Stitches, and brought them as cloſe as

only I could with any tolerable Eaſe, dreſs up the Wound as before.

After ſome Days, I found the Wound tolerably well digeſted, ſo I dreſs'd it with *Pugnent.* dip'd in the former Balſam, and apply'd over the Wound *Empl. Diaſulphuris Rulandi*, with Bandage and Compreſs as before: Take Turpentine, Roſin of the Pine, Oil of St. *John*'s Wort, of each four Ounces; *Sarcocolla*, Myrrh, Frankincenſe, of each three Drams; Wax, what ſuffices to make an Ointment.

Thus I happily deterg'd and incarn'd, and by the Help of Ointment of Tutty, and my ordinary *Epiloticks*, cicatriz'd the Wound; and it was not long after that the Patient recover'd the Uſe of his Hand. I met with another of the ſame Kind in a Coach-man, who was wounded tranſverſe the Back of his Wriſt, ſo deep into the Joint, that his Hand doubled quite inward; this oblig'd me to cauſe a *Ferula* to be placed under his Hand to keep it ſtraight, after this I ſearch'd the Wound and pull'd out many Fragments of Bones, after which I cleans'd and brought the Lips together by three diſtinct Stitches, yet ſo as to leave a Vent for the Matter in the Ends of the Wound, which were both depending.

I then ſprinkled the Powders of Myrrh, Aloes, Frankincenſe, *&c.* upon the Suture, and apply'd a Digeſtive of Turpentine with the White of an Egg on the reſt of the Wound, and a Defenſive over all, and ſo dreſs'd it up. This done, I adminiſtred Veneſection, and order'd ſix Drams of Syrup of *Diacodium* to be given him in a Draught of Mace-Ale, in Hopes of diſpoſing him to Reſt the next following Night; but he ſlept very ill all that Night.

The ſecond Day I took off the Dreſſings and fomented the Wound, and all the Parts with an emollient Decoction, and then dreſs'd up his Wound with Digeſtives as before, embrocating the circumjacent Parts with Oil of Earth-worms, and then apply a Plaiſter of Bole over all. On the third Day after I dreſs'd him again, and now finding the Wound digeſted, I took out the Stitches, and dreſs'd the Wound with my Digeſtive of Turpentine, dip'd in my before-mentioned Balſam; at the ſame Time I apply'd a Cataplaſm warm over all the Wound and Hand, in the ſame Manner as has been preſcrib'd in the former Obſervation, and then once more roll'd up the Member.

At the next Dreſſing, there was an Appearance of ſomewhat more of an Inflammation, notwithſtanding which, the Wound was not altogether well digeſted, nor did the ſtitch'd Lips ſeem to incarn, but thruſt forth a ſoftiſh white Fleſh: I therefore cut the Stitches and digeſted with Precipitate, and apply'd Pledgets ſpread with *Mundif. ex Apio*, with the ſame Cataplaſm as before over all. This I deterg'd, and afterwards incarn'd with the common Sarcoticks, and cicatrized with *Calx Lota*, then I apply'd a *Catagmatick Emplaiſter*, and by the Help of a laced Glove, diſpell'd the pituitous Swelling and ſtrengthen'd it: However, it continued extreamly weak and painful for a conſiderable Time after, ſo that he was forc'd to ſupport his Wriſt for a long Time, by wearing the beforeſaid *Ferula*.

Of Wounds of the Veins *and* Arteries. *From the ſame Author.*

THE Wounds of the *Veins* and *Arteries* are ſubject to great Effuſions of Blood, and therefore require the ſpeedy Aſſiſtance of a Surgeon. The Blood that iſſues from a *Vein* may be diſtinguiſh'd from that which comes from an *Artery* by the Flowing of it, and by its Colour. The Blood ruſhes from the *Artery* with an Impetuoſity and *per Saltum*, by reaſon of the Dilatation and Contraction of the Heart, and is alſo of a florid Colour: Whereas the Blood flows from the *Veins* with a more Smooth and equal Stream, is of a thicker Conſiſtency and a darker Colour: The Wounds of the *Veins* are not very dangerous: *Galen's Powder* with the Whites of Eggs, and the Way of Dreſſing as propos'd before, will check the Bleeding, and cure the Wound in a few Days. But the Wounds of the *Arteries* are very hard to be ſtop'd, becauſe in them the Blood is in its more vigorous and ſtrong Motion.

In caſe the Lips of theſe Wounds are not much bruiſed, or that there is a Loſs of Subſtance in them, you may bring both the Lips and the Openings of the *Arteries* together and retain them by Sutures, ſo as to paſs your Needle with a ſtrong waxed Thread through both of them, and make the Glovers Stitch; after which you muſt imploy Emplaſticks; as for inſtance, Take Bole Armon. three Ounces; Dragons-Blood, Frankincenſe, Aloes, dry'd Glue, of each an Ounce; Acacia, Sumach, of each three Ounces; mix with the White of Eggs to the Conſiſtency of Honey, and apply over it a Compreſs ſqueez'd out of Oxycrate or Red-Wine, then roll up the Member with the agglutinative Roller, beginning on the oppoſite Part, and bringing both Heads over the Wound, and then after you have taken two or three Turns, roll both upwards and downwards, by which Means you may preſs the Blood upwards, and reſtrain the Influx from above.

Your Bandage muſt be contriv'd for the Eaſe of the Patient, and the Poſition of the Member, ſuch as may beſt prevent Pain. He muſt be kept cool and quiet, and obſerve a ſpare Diet; his Drink above all Things muſt be cooling and aſtringent, as Fountain-water with ſome *Sal Prunell.* diſſolv'd in it, or Vinegar, or Gads of Steel quench'd in it, and ſweeten'd with Syrup of Coral, Pomegranates, Lemons, *&c.* The following Draught of *Quercetan* is very good: Take *Crocus Martis*, Eſſence of Coral, of each one Scruple; of Syrup of dry'd Roſes and Myrtles, of each an Ounce; Poppy-water, four Ounces; mix: As alſo a Decoction of Barley, with white Poppy and Henbane-Seeds, to which put Roſe-water and Sugar of Roſes to ſweeten it, and ſometimes a Grain or two of *Laudanum*, in caſe of high Neceſſity, and if the Patient is able to bear it, you may alſo adminiſter Veneſection on the oppoſite Part, if he have Strength to bear it; a little at a Time by Way of Revulſion, and Cupping-Friction and Ligatures of the remote Parts by Way of Derivation.

'Tis further to be obſerv'd, that in Wounds of the *Arteries*, you muſt dreſs as ſeldom as is poſſible; for once in five or ſix Days is ſufficient, as long as the Danger of a Flux of Blood continues, unleſs you that the Blood has made its Way thr the Dreſſing. If you ſee the Bleeding continue, you muſt take them off, then, if you perceive the Stitches br and the Lips of the Wound in ſuch a C dition as not to admit of a ſecond Su you ought then to conſider whether Bleeding *Artery* may not be taken up, kept cloſe together by a Ligature; if judge it may do ſo, the Way of which be ſhown you in one of the following Obſervations; this done, proceed in the Cure by *Sarcoticks*, *&c.* But in caſe the *Artery* eth ſo deep, that there is no coming at it to make a Ligature of it, you muſt have Recourſe to the Application of Eſcharoticks to the Veſſel, or to an actual Cautery.

If you are to apply Eſcharoticks, you muſt cleanſe the Wound of the clotted Blood, and dip your Doſſils in ſome ſuch like Powder: Take Frankincenſe-Powder, two Ounces; Aloes, dry'd Glue, of each an Ounce; burnt-Allum, two Ounces; Arſnick, ſix Drams; Alabaſter, three Ounces: Apply theſe with Lint on the Bleeding *Artery*, and over it Doſſils of Lint dip'd in Whites of Eggs with *Galen's Powder*, and dreſs up the Wound, as you have been directed before. At the next Dreſſing, leave the Eſcharotick ſticking on the *Artery*, and incarn as faſt as you can: But for want of the aforeſaid Powders, take Vitriol powder'd, tye it in a clean Rag, and apply it to the *Artery* with a convenient Dreſſing over it. But if after all this, the *Artery* ſtill continue bleeding, you muſt proceed to the actual Cautery, by which Means the Veſſel will ſhrink up at both Ends; the Cautery you muſt convey down to the *Artery* by the Help and thro' a *Cannula*, and for fear the Cautery ſhould burn thro' it, you muſt cover the Outſide of it with a Plaiſter of a Rag wet with the White of an Egg, and that done, dreſs the cauteriz'd Part with Doſſils dip'd in Mucilage of Quince-Seed, or with the White of an Egg, and embrocate the circumjacent Parts with Oil of Roſes, applying the Plaiſter of *Diacalcitis* with Juice of Plantane over all.

After you have allay'd the Heat of the Part, digeſt, incarn and cicatrize the Wound, as followeth. A Gentleman of about

Years of Age, received a Wound with Rapier on the right Side of the *Aſpera Ar-* into the internal Jugular thro' his ck, where it paſs'd out below the laſt *rebra*. It bled with a full Stream, tho' Wound was but ſmall, ſo I got a Ser- nt to ſtop it with his Fingers, whilſt I pared the Dreſſing of our common aſtrin- Powders with the White of an Egg d a little Vinegar, ſpread upon a Pledget Lint, and an Emplaiſter of the ſame, ith Compreſs and ſuch Bandage as it ould bear: The Wound behind continu- g to bleed, while that before was dreſs'd, apply'd the ſame Remedies to that alſo, and us'd them to be held cloſe, till they were ry'd on: After this, we put him to Bed, d kept him cool and quiet. I us'd all Means to keep his Blood in an even Tempe- ature, and dreſs'd him no more than once four or five Days, unleſs when I was rced to do it by the Burſting forth of the Blood, for he bled at times about Sixteen or ſeventeen Days. His Wound near the *Ver-* *bra* of the Neck healed in a few Days, nd the other near the *Aſpera Arteria*, was ured alſo by this Way of Agglutination, by the Nineteenth or Twentieth Day.

A Man who was wounded in the *Artery* nder the right Eye, was immediately dreſs'd by a Surgeon, but the next Day the Blood burſt out again with much Violence, tho' it was not above the Bigneſs of a Sil- er Penny, it having been made by the Corner of a Trenchard. I dreſs'd it with *Galen's* Powder, and apply'd a Plaiſter over it, made up with my common reſtrictive Powders, with the White of an Egg, Com- preſs and good Bandage: The next Day it fell a bleeding again, and when I ſtop'd it with my Finger, I obſerv'd the Blood to beat all along the *Artery*, from the Aper- ture to the temporal Muſcle, with a greater Force than is commonly obſervable in an *Aneuriſm*. I then took a curved Needle, which I drew through the Lips and Artery, and ſo by Deligation reſtrain'd the Flux of Blood, and then dreſs'd it up with Empla- ſticks as before: But in two or three Days after it burſt out again, and in my Ab- ſence it being dreſs'd by ſeveral other Sur- geons, ſuch as they could firſt meet with when the Bleeding call'd for immediate Help by the Crowding in of Doſſils, and frequent Application of Echaroticks to ſtop the Bleeding, the Patient's Eye was ſo much inflamed and corroded, that it was believed he would loſe it; tho' in the Main, there was but little Hopes of his Recovery, his Spirits being quite exhauſted by his frequent Bleeding. At the laſt burſting out of the Blood, I and two Surgeons more were call'd together, where we found him lying as dead, without any Pulſe, as far as we could perceive; ſo we took off the Dreſſing with all poſſible Speed, but it did not bleed, tho' it was open, the Artery lying in the Wound, torn by the Application of the Eſ- charoticks. So we took and tied up the Ends of it, dreſs'd the Wound with Lini- ment *Arcæi* and a Plaiſter over it: From that Time the Wound never bled any more, and it daily incarn'd by common Remedies, and was cured ſoon after to my Admira- tion; for the Patient was in leſs than a Month's Time compleatly well, both of his Wound and Eye.

A young Gentleman of an ill Habit of Body, being wounded by a Penknife in the Inſide of the Calf of his Leg into the crural *Artery*, had his Wound dreſs'd by a Surge- on with Doſſils dip'd in Eſcharotical Pow- ders, ſuch as *Calcanthum uſtum*, *&c.* with Plaiſter and Bandages, and ſo the Bleeding was ſtop'd: I was call'd the next Day, and being inform'd how it was dreſs'd, I did not think fit to open it then, but adviſ'd him to keep quiet in his Bed. The third Morning I met his Surgeon there, and found the Bandage all bloody, ſo we took off the Dreſſings, and ſaw the Blood freſh in the Rollers, but in taking off the Plaiſter, the Doſſils came out only foul'd with a bloody *Sanies*, as is uſual in the like Wounds, af- ter the filling them with ſuch Powders.

The Wound and circumjacent Parts were inflam'd and tumefy'd, notwithſtanding which, the young Surgeon was ſtill for ap- plying Echaroticks again: However, upon my preſſing Perſwaſions, the Wound was dreſs'd with a Doſſil, ſpread with the com- mon Digeſtive of Turpentine with the White of Eggs ſprinkled with *Galen's* Pow- der, and embrocated the Parts about with Oil of Roſes and Vinegar, applying the Emplaſter of Bole over all, with good Ban-

dage.

dage. By this Method the Patient found Eaſe, and the Wound was at Liberty to diſcharge the *Sanies*, which was made and choak'd in by the preceding Dreſſing. The next Day the Patient was ſomewhat uneaſy, doubting that his Wound would not be cured without a Tent, but continued pretty well, and did not bleed. The fourth Day, when it was open'd, we found no Blood but what was mix'd with Matter, and the Wound look'd well, notwithſtanding which, to comply with the Patient, I put in a ſhort Tent ſpread with the aforementioned Digeſtive: The third Day after that, we open'd it again, and found ſome freſh Blood upon the Dreſſing, follow'd by a thick white Matter as from a *Phlegmon*, which proceeded from an Apoſtumation made by the Eſcharoticks: The Wound thus digeſting, I left off the Uſe of the Tent, and dreſs'd it with a Doſſil, and by the Help of good Embrocations, Compreſs and Bandage, preſs'd out the Matter which leſſen'd at every Dreſſing, but was not very well digeſted, nor free from ſome Tincture of Blood, but this proceeding from his ill Habit of Body, he being highly Scorbutical, the Phyſician was conſulted, and the Wound cured, which would have been done ſooner, had his Leg immediately after the firſt Dreſſing been bound up with the Agglutinatives.

A poor Fellow being prick'd in an *Artery* with letting Blood, the Arm ſwell'd much and grew painful: A Barber-Surgeon by unfit Applications ſcarified the Tumour, and made Way for the Extravaſation of the Blood, which increaſing the Tumour and rendring it ſoft, and the Barber ſuppoſing it to be a Suppuration, open'd it by a Lancet; but to his great Surpriſe of all, there ruſh'd out with great Violence no leſs than four Flaggons of Blood, as they told me: They made a Shift to ſtop it, but the Bandage being both too ſtraight and unequal, the Arm tumefied and inclin'd to a *Gangrene*. I with ſome other of His Majeſty's and Royal Highneſſes Surgeons viſited him, and the Patient being taken out of his Bed and placed in a Chair near the Light, we view'd the Arm, and found no *Gangrene*, according to the Report of his Country Surgeon, but rather an *Ecchymoſis*, and ſo we made a Bandage above the Wound, to prevent the Influx of Blood: We made an Inciſion into the Tumour, on the Inſide of the according to the Length of it, over th *tery*; and after having taken out the c lated Blood and laid the Veſſel bare paſs'd a Needle with a Ligature unde *Artery*, and tied it, cut off the Ends and looſen'd the Bandage above: And ing it to bleed no more, we dreſs'd it Pledgets dip'd in the common Digeſtive Turpentine with the White of an Egg, plying them with *Galen*'s Powder next *Artery*; and lightly fill'd up the Wou with Pledgets of the Digeſtive dip'd in of Roſes warm, then embrocated the Ar with ſome of the ſame Oil, and laid *Emplaſt. Diacalcitis* over the Wound and neighbouring Parts, and apply'd alſo *Paracelſus's* Plaiſter, and *Diacalcit.* over the Hand and Arms, they being *Oedematous*.

Then he began with our Bandage at h Hand and rolled up the Wound, where ter we had taken a Turn or two ove we rolled up to the Arm-pit; we then der'd him to be laid into Bed again, placed his Hand upon his Breaſt. At next Dreſſing the Tumour was diſper the Wound freſh and tolerably dige Then we paſs'd another Ligature upon ſame *Artery* above the Firſt, and in pull the Firſt to divide the *Artery* between Ligatures, the *Artery* broke, which was well: We dreſs'd it up in the ſame Way we had done before, only we left out Powders. At the next Opening we fou the Wound in a good Condition, the L of it being digeſted and contracted, ſo dreſs'd it up with *Mundific. Paracelſi*, So that ſeeing it in a hopeful Way of C and being oblig'd to return to *Londo* left the Patient to my Fellow Surgeons, dreſs'd it with good Succeſs for the S of ten Days after, without the leaſt App ance of Blood: But in ſome of their fence, the before-mentioned Barber-Surg muſt needs be meddling, and dreſs'd the tient, and whether it was by wiping of Knot, or crowding in Doſſils, it burſt again: However, the *Artery* being divi it was ſoon ſtop'd by the Application *Colcothar*, and from that Time bled more.

The ancient Way of Delegation or ma- these Ligatures, was by tying it in distinct Places, and cutting the *Artery* between; but the Patient being very to faint, interrupted us in that Work: d to ſpeak the Truth in ſuch a Caſe as where a Country Barber-Surgeon was be intruſted with the Accompliſhment of the Cure, it had been better the *Artery* had not been divided; for then it would have been put out of his Power to have rubb'd off the Ligature, and no Damage could enſue, for before the Wound could have come to a Cicatrization, the Ligature would certainly have fallen off it ſelf, without the leaſt Danger of Bleeding again.

Of the Aneuriſm, *that is, the Dilatation or Rupture of an Artery: Taken out of Monſieur* Dionis, *his Eighth Demonſtration of his Courſe of* Chirurgical Operations, *and* Muſitanus's *Body of Surgery.*

THE Word *Aneuriſm* or *Anefriſma*, is deriv'd from the *Greek* Word *Anefremin*, which ſignifies to Extend or Enlarge, becauſe it is ſoft pulſative Tumour, which will give way to the Touch, being caus'd by an Exſion or Dilatation of an Artery, or by Concretion or Extravaſation of the Arial Blood out of its Veſſel.

By this Definition, we underſtand there two Sorts of *Aneuriſms*, one which is de by the Dilatation of an *Artery*, which ing diſtended and enlarg'd by little and tle, forms a Bag or Pouch that is fill'd with Arterial Blood: The other owes Origine to an Inciſion or Rupture of an tery, when the ſame Blood being extraated beyond its proper Veſſel, diffuſes ſelf, and is coagulated in the adjacent rts.

An *Aneuriſm* that ariſes from a Dilatation roduced from two different Cauſes, *viz.* her Internal or External: The Firſt is, en a corroſive Humour having in Part roded the exterior Membranes of the Ar-y, ſo as that the interior Membranes ce being inſufficient to reſiſt the Impul-n of the Blood, are oblig'd to ſuffer a tention, by giving Way to the continual ulations of the *Artery*. The Second hap-s when the *Artery* being touch'd on its exterior Part by the Point of a *Lancet*; the ſame Pulſations not finding the *Arterial* Channel ſo ſtrong in that Part, they force the inward Membrane to give Way, whereby a Dilation being produced in the *Artery*, the Tumour that follows, exceeds the Bounds of the *Arterial Conduit*.

An *Aneuriſm*, where there is an Inciſion or Rupture of the *Artery*, is always derived from ſome external Cauſe; as for inſtance, a Wound made with the Point of a *Sword* or a *Lancet*, which making an Aperture within the Body of the Artery, opens a Way for the Blood, which being extravaſated, expands or ſpreads it ſelf betwixt the Skin and the Fleſh. Such a Rupture may be occaſion'd alſo by ſome extraordinary Effort, or ſome exceſſive Crying, as a Woman in Labour, *&c.* all which are able to produce the ſame Diſorder in the Artery, as if an Aperture had been made by Inciſion. An *Aneuriſm* may happen in any Part of the Body, in the Head, Neck, Breaſt or Belly; in theſe Parts they appear moſt commonly of a prodigious Size: But it being only proper in this Place to ſpeak of thoſe *Aneuriſms* here which are the Conſequence of Bleeding, I ſhall alſo limit my Inſtructions to the Operations that belong to them.

In adminiſtring *Phlebotomy*, whereof you have a large Account in the Firſt Volume of this *Bibliotheca, pag.* 353. you may diſcover whether you have open'd an Artery by the impetuous ruſhing out of the Blood from the Veſſel, and by ſuch other Signs as we have had occaſion to ſpeak of in the Volume aforeſaid, in treating of the Operation of *Blood-letting*. Whenever ſuch a Miſchance happens, you muſt not ſeem ſurpriz'd, but go on unconcern'd in your Buſineſs, juſt as I have inform'd you. But in caſe the Patient happens to perceive it, or that the Blood does not come out of the Artery with a full Spout or Stream, and that you are ſenſible by the Swelling or Riſing about the Orifice of the Place, where the Inciſion has been made, that the Blood runs betwixt the Skin and the Fleſh, 'tis then high Time to own your Error, and put your Thumb upon the Aperture, before any conſiderable Part of the Blood be extravaſated and ſettled thereabouts; you muſt then let the Patient know his Danger, that he may the more willingly ſubmit to what ſhall be judg'd neceſſary, to prevent the ill Conſequences of ſuch a Misfortune.

Whilſt the Surgeon holds the Thumb of his Left Hand upon the *Artery*, he muſt with his Right take off the Ligature, and let every Thing be got ready, *viz.* Bands, Compreſſes, wetted Paper to make a Stopple of, unleſs he can have one half of a dry'd Bean to apply to it. He is then to lay along the Artery a thick Compreſs, which muſt be kept firm and ſtraight, by Means of a Ligature tighten'd with a Preſs or Screw: When he judges the Compreſſion ſtrong enough to prevent the Courſe of the Blood in the Artery, he takes aways his Thumb, and whilſt the Blood is thus ſtopp'd, lays on the Orifice a Stopple of wet Paper, or half a dry'd Bean, or a Piece of Money within the Compreſs; he puts over this another ſomewhat larger, and at laſt a Third, that ſo the *Artery* may be compreſs'd gradually, and after all theſe, two Bands that muſt be drawn tighter than in ordinary Bleedings.

After the Arm is well bound up, he muſt put this Thumb again upon the Compreſſes, before he takes off the Wrench; which done, he lays on a narrow, thick, Bolſter over the *Artery* along the Arm over that a Band of three Fingers br which you muſt bring by ſeveral Ci volutions from the Elbow to the Sho and by this Means ſtop the Blood, wi any further Danger of an *Aneuriſm*. the Arm is dreſs'd thus, you muſt let Patient blood ſeveral times in the op Arm, placing the Arm in a convenien ſture, neither too much bent, nor too extended, ſo that the Wriſt and the be placed ſomewhat higher than the E upon a ſmall Pillow, to keep it ſtead without Motion. The Dreſſing mu be taken off, till ſeveral Days after, leaſt not unleſs the Arm ſhould ſwel exceſſively, or that by certain Signs have Reaſon to conclude, that not ſtanding the Bandage, the Blood con to flow from the *Artery*, for then it is to proceed to the Operation, which c be any longer deferr'd in ſuch a C without putting the Patient in Dang his Life.

We are not to follow the Example certain Surgeon, who having open'd a tery of one of the King's Officers, thou that becauſe he had very well bound Arm, and render'd himſelf Maſter Courſe of the Blood, that no ill C quence would happen: 'Tis true, the did not come out, by reaſon of the Str neſs of the Bandage, but eſcap'd out Artery, and ſlid towards the upper of the Arm, which it fill'd to that gree, that it was ſwell'd to an extraord nary Bulk. This happen'd four L from *Verſailes*, whither I was call'd t form the Operation, and was forced to the Skin along the Arm, in order to out above four Pounds of Blood, was coagulated betwixt the Skin and Fleſh, from the Elbow to the Sho around the whole Circumference o Arm.

If the *Aneuriſm* owe its Cauſe to a tation of an Artery, there is not ſo a Neceſſity for an Apertion, as where owing to an Inciſion; for the Art of ry furniſhes us with Means to avo which ought to be try'd before you co the Operation. When a Surgeon find

has touch'd the Body of an Artery, as when he is bleeding in the *Baſilica*, he may perceive if he meets with or feels ſomething that makes Reſiſtance to the Point of his Lancet, ſuch as he us'd not to be ſenſible of in common Bleeding. If (I ſay) he finds any ſuch Thing, he ought to fear or ſuſpect ſome ill Conſequence, to avoid which, let him apply a Compreſs ſomewhat thicker than ordinary, keep the Arm bound or ſwath'd for ſeveral Days without opening it, order his Patient not to uſe his Arm much, and for the greater Security, to dip the Bolt or Compreſs in Styptick Water.

It happens ſometimes, that when the Patients grow impatient of wearing the Band or Ligature too long, and then in caſe the interior Coat of the Arteries has been touch'd by the Lancet, the Blood will by its continual Impulſe extend that Part of it where it is thus weaken'd, and this produces a Tumour, which at firſt is ſcarce of the Bigneſs of a ſmall Pea, but growing bigger and bigger every Day, at laſt riſes up to the Largeneſs of a Hazle Nut, or perhaps of a Walnut. If the Surgeon be ſenſible of it as ſoon as it begins to riſe, it is much eaſier for him to cure it than afterwards when it is grown to ſome Bulk. He may know it to be an *Aneuriſmatical* Tumour by the Touch, for he may feel in it a Pulſation like that of an Artery or the Pulſe, and whilſt it is yet ſmall, when he preſſes upon it, it will diſappear, becauſe by ſqueezing it the Blood is preſs'd back into the Body of the Artery. Some (I know) apply very cold Water to the Tumour, or ſome other Thing that is very cold, by which they pretend to cure it. Styptick and Aſtringent Medicines are very proper, becauſe they are qualified to ſtraighten and draw together the too much relaxed or dilated Tunicks of the *Artery*; but theſe Remedies alone will prove altogether uſeleſs, unleſs they are aſſiſted by Bandage, which muſt be worn for whole Years together.

Mr. *Bourdelot*, Firſt Phyſician to the Prince, invented a Bandage for the Cure of an *Aneuriſm* which happen'd to himſelf after Bloodletting. This he call'd a *Ponton*. It conſiſted of a round Steel Plate or Shield made for that Purpoſe, and cover'd with Cotton and Leather, like the Bandage for Ruptures. This ſmall Plate is provided with Straps, which are to run above and below the Elbow, and to be faſten'd on the Inſide of the Arm on the Middle of the flat Part of the Plate. The little Holes in theſe Straps are to tighten or ſlack the Shield or Scutcheon at Pleaſure; and though this Plate is made to preſs the Tumour, it has yet a ſmall Channel left on purpoſe to allow the arterial Blood the Liberty of running under it; whence is derived its Name of *Ponton*, it being a Sort of Bridge which does not obſtruct the Paſſage of the Water of a River. The Patient is to wear it for the Space of a Year, and the Tumour diminiſhing daily, at the Extirpation of that Time he will find himſelf perfectly cured.

This Inſtance is a Hint to the Surgeon, that he ought to be fruitful of Invention, that he is to endeavour to adviſe proper Bandages and Engines to cure his Patients without Operation, and if he will make uſe of thoſe invented by our Predeceſſors, he is to augment or diminiſh them according as the Diſpoſitions of the Diſeaſes require: But when he has exhauſted all his Induſtry, and the Tumour will not yield to his Remedies, he is then to proceed to Operation, which is to be perform'd with all the Precautions neceſſary to render us Maſter of the Blood, that the Patient do not die under the Operation, as it ſometimes happens. How skilful ſoever the Surgeon may be, and though he has performed this Operation ſeveral times, he is to diſtruſt his Skill and Addreſs; becauſe that during the Time that the Tumour is open, he may be ſurpriz'd by the iſſuing out of the Blood, which flies out impetuouſly, and in that Moment he may loſe that Preſence of Mind which he ſtands in Need of, in order to put a quick Stop to the Fury of the Blood; wherefore I adviſe him not to undertake it without calling one of his Brethren, able to aſſiſt him with his Advice, and help him in caſe of Need in this nice and hazardous Operation.

Before the Operation, we are to prepare all Things neceſſary, as well as the Inſtruments, becauſe we muſt be provided for the Dreſſing, without being put to ask or wait for any Thing. We muſt have ready a Preſs or Wrench compos'd of a Ligature which goes twice round, and of one or two Sticks

of the Thickneſs and Length of a Finger, an Abſceſs Lancet, both ſtraight and crooked Sciſſars, an Inciſion Knife, a Worm, curve Needles threaded with a ſmall Wax Thread, Vitriol Buttons in caſe of Need, ſeveral ſmall Bolſters of different Lengths, a large Quantity of Lint, Aſtringent Powders, a Plaiſter, large Bolſters, two Bands, and to conclude, every Thing that he can imagine fitting and neceſſary for ſuch a Work.

Before the Operation, the Patient being plac'd in an eaſy Elbow Chair, and in the moſt commodious Poſture for the Operator againſt the Light, a little leaning backwards, and the Arm extended as for Bleeding, the Surgeon is next to place the Servants, of which there are to be at leaſt four. If the *Aneuriſm* is in the Right Arm, the Operator is to ſet the firſt of them, which is he on whom he moſt relies, at his Left Hand, to graſp the Patient's Arm, in order to compreſs or hold down the Artery when neceſſary. The Wriſt he gives to be held by the ſecond, who with one Hand holds that of the Patient, and with the other claſps the Wriſt faſt, to hinder his withdrawing or moving it during the Operation, and this Servant is to be at the Operator's Right Hand. The third is to ſtand before him and hold a Baſin, on which is to be laid all the *Apparatus*, that he may take at Pleaſure whatever he wants, or lay down any Thing after uſing it: And the fourth is to be ready to obey the Orders of the Operator.

All theſe Neceſſaries thus diſpoſed before he opens the Tumour, the Surgeon is to conſider how to keep the Blood under, and prevent the iſſuing out of more of that Liquor than he would have. This is to be done three Ways, by Ligature, by the Hands of a Servant, and by the Wrench. The Ancients made uſe of a great crooked Needle, threaded with a ſtrong Silk twiſted, which they ran acroſs the Arm, beginning with thruſting it in below the Artery near the Bone, and drawing it out again through the Middle of the *Muſculus biceps*, and by that means taking hold of the Artery with the Nooſe of the Silk Twiſt, they bound it over a Bolſter hard enough to ſtop the Courſe of the Blood in that Artery. This Method ſeem'd ſo cruel to the Surgeons that ſucceeded them, that they quitted it, contenting themſelves with the Hand of a Servant, which they ſubſtituted inſtead of this troubleſome and painful Ligature. However though this is the eaſieſt, it is not the ſecureſt Way; for the Hands may tire by a long Compreſſion, and the Duration of the Operation, and before we have ſubſtituted another Perſon in the Place of the former, the Patient may loſe a great Quantity of Blood, and the Operation be interrupted or perplex'd; which has put the Moderns on inventing the Wrench or Preſs, at preſent us'd as well in *Aneuriſms* as *Amputations*.

This Sort of Ligature is call'd in *French* a *Tourniquet*, becauſe that by turning of two little Sticks that run betwixt the Arm and the Ligature made of Tape, we draw it as hard as we pleaſe; and 'tis in this Manner that the Carriers with a Stick draw tight the Cords which fix and ſettle the Packs on their Carts and Waggons. We fix on the Arm a circular Band, in order to prevent as much as poſſible Pain and Mortification of the Skin. When we have turn'd it enough, and thereby ſufficiently ſtrain'd the Ligature, we entruſt it to be held by a Servant, who may tighten or ſlacken it at the Pleaſure of the Operator. This Inſtrument was invented thirty Years ago, during the Siege of *Beſançon*, by one of the Army Surgeons, and ſince that Time has always remain'd in Uſe.

This Wrench being plac'd two or three Fingers Breadth above the Bending of the Elbow, the Surgeon with a large Lancet opens the whole Length of the Tumour, beginning at its lower Part. If he does not find it ſufficiently laid open by the Lancet, he ſeconds that Effort by ſome Cuts with a Pair of ſtraight Sciſſars, or crooked ones, either upwards or downwards, according as he thinks fit: Then having thruſt a Finger or two into the Tumour, he empties it of all the coagulated Blood he there finds, cuts away the Bridles or Stays which he finds there, and having remov'd all that hinder him, he orders him who holds the Wrench to looſen a half Turn, that he may diſcover the Situation of the Orifice in the Artery which ſufficiently ſhows it ſelf by the impetuous ſpringing out of the Blood. The Aperture of the *Artery* being found, the Surgeon is to conſider how to ſtop the Blood

Blood, and the Symptoms to which he finds the Patient diſpos'd, are to determine him which of the Three Methods he is to take to compaſs that End.

The Firſt of which is with chew'd Paper to make two Stopples or Tents, and fix them on the Orifice of the *Artery*; or elſe a little Bolſter dip'd in ſome Styptick Water, and lay it directly on the Body of the *Artery*, and above that ſeveral others a little larger than each other, and by thoſe Means to ſtop the Blood. The Second is the laying on the open Artery a Cauſtick, or one of the Vitriol Buttons, which by their Scarifications ſtop the Blood, purſuant to the uſual Practice in Amputations in ſome Hoſpitals, in which the Surgeons aiming ſolely at Diſpatch, are wholly unconcern'd at the ill Effects of theſe Ingredients. The Third is with a Penknife or Lancet to diſſect the Pipe of the Artery, and having rais'd it with a crooked Knife, to paſs through under it a Needle threaded with coarſe Wax and Thread, which is to be tied above the Orifice of the Artery, and which we are ſo to cloſe that the Blood cannot run through the Pipe. We are to leave the Ends of the Thread long enough to hang about four Fingers Breadth out of the Wound. 'Tis needleſs to lay any ſmall Bolſter on the Knots of the Thread, or make any ſecond Ligature below the Wound in the Artery; for when our Predeceſſors did ſo, they were ignorant of the circular Motion of the Blood; but at preſent we being certainly convinc'd on that Head, this Knowledge improves our Operations, by bringing us to retrench ſeveral uſeleſs and ſuperfluous Circumſtances.

Of theſe Three Ways of ſtopping the Blood, the Firſt is preferable to the Two others, becauſe it preſerves the Artery, and is aim'd at no other End than the cicatrizing the Wound; and if the Caſe will not admit of it, the Ligature is to be preferred to the Cauſticks, and is accordingly made uſe of by the ableſt Practitioners at preſent.

After the Performance of the Operation either of theſe Three Ways, the Patient is to be dreſs'd. If we take the Firſt or the Second Way, we are to ſtop the Wound very well with the Linten Stopples and Pledgets, and plentifully uſe Styptick Powders, in order to hinder the iſſuing out of the Blood: But if we apply the Ligature, the Wound is to be barely dreſs'd only, by reaſon we are in that Caſe ſecured againſt a Poſſibility of the Blood running out. In the firſt Days we are to apply Pledgets cover'd with ſome Unguent, in the Compoſition of which the Aſtringent Powders enter. We then lay on the long Bolſters, and others acroſs them in Form of an *X*, the better to faſten them; then a long Plaiſter, both Ends of which are ſlit; then a Bolſter of the ſame Shape; and over all a Bandage, which is to be roll'd circularly above and below the Elbow, and acroſs it ſelf on the Wound. This Bandage is very like that us'd in Bleeding, only the Band is broader and longer, and does not end in a Knot. We are alſo to lay two Bolſters dip'd in *Oxycratum*, one on the Wriſt, and the other on the Arm; and over them we are to roll the Band circularly above the Wriſt, continuing it on up to the Shoulder, and end by winding it once about the Body, obſerving to lay on the Arm, lengthway of the Artery, a long thick Bolſter, that by it the Compreſſion being the more forcible in that Place, may hinder the too violent Flux of the arterial Blood towards the Ligature.

We are then to lead the Patient to his Bed, where we are to lay him in a Poſture a little rais'd, and his Arm half bent on a Pillow; and though he has been bled before the Operation, he is yet to be ſeveral times bled again, to prevent the impetuous Flux of the Blood to the Part affected. We place by the Patient a Servant, who Day and Night is to hold faſt the Place of the Operation, to prevent the Irruption of the Blood, which it being impoſſible for him alone to reſiſt, there are to be two or three which are to perform this, alternatively relieving one another.

On the firſt Days we are to oblige the Patient to a very ſparing Diet, that he don't produce too much Blood. We are to be vigilant over whatever may happen, and not to take off the Dreſſing before the Expiration of three Days; and when we do, to leave the laſt Bolſters and Stopples, that is thoſe which touch the Artery, in Expectation that they will fall off themſelves.

Withal we are to obſerve every Time we dreſs the Patient to cauſe his Arm to be graſp'd by a Servant, in order to preſs the Artery, as we have already hinted.

We are not to abate the moſt minute Particular which can contribute to keeping the Blood under; for even when we think our ſelves ſecure, an unforeſeen Flux of that Liquid, which frequently happens, obliges us to renew the Operation, and may hazard the Life of the Patient before he is helped: For which Reaſon nothing is to be neglected, nor any firm Promiſes made of a perfect Cure. We are, in Proportion to the cloſing and filling up of the Wound with Fleſh, to extend the Patient's Arm a little more; for if we ſuffer the Wound to cicatrize with the Arm bent, the Patient will never be able to hold it ſtraight, but though cured of his *Aneuriſm*, will ſtill remain lame.

'Tis very ſurprizing to obſerve the ſtrange Prepoſſeſſion of the Populace, who to this Day believe, that the Surgeons are oblig'd to allow a Penſion to thoſe whom they hurt in Bleeding. A celebrated Surgeon, which has been dead about thirty three Years, whoſe Name is reverenc'd amongſt us, and who having required a greater Reputation for Bleeding than any before him, own'd, that in one Year he open'd eleven Arteries. None could charge him with bungling, none bleeding better than he; but it was to be aſcrib'd to his bleeding ſo many, and in difficult Caſes, being ſent for all over *Paris* to bleed thoſe Arms which all others refuſed, ſo that it was not poſſible for him to eſcape this Misfortune, which would have happen'd more frequently to any other beſides himſelf. If then he had been oblig'd to give Penſions, the whole Eſtate which he had got by forty Years Labour, would ſcarce have been ſufficient to have paid them.

Waiting on the Duke of *Burgundy* into *Germany* in the Year 1703, we paſs'd thro' *Reims*, in which Place was ſhew'd to Mr. *Ducheſne* and my ſelf a Maiden of about thirty Years, who was afflicted with Convulſions all over her Body, which we were told reſulted from her being bled, and for which the Surgeon was threatned to be made *reſponſible*. Some of his Brethren of the ſame P[rofeſ]ſion, being back'd by ſome Phyſicians, this young Woman upon him to deman[d] Penſion, and to that Purpoſe there was Indictment drawn up againſt him, w[ith] their Reports, which charg'd him w[ith] pricking a Tendon. I examin'd her Arm, and finding the Skin looſe on the Tendon, I aſſured them it was not touch'd, by reaſon that a Tendon exfoliates like an uncovered Bone on which there grows a Fleſh, which uniting it to the Skin, faſtens them toget[her] as there proceeds from the exfoliated Sk[in] which cicatrizing with the hairy Scalp, glutinates them together: But notwithſtanding the Report which Mr. *Duch[eſne]* made, the Proſecution went forward, and was by Appeal remov'd to the Parliament of *Paris*. I gave in my Report, which being found conform to that of the Phyſicians and Surgeons appointed by that Court, the Surgeon got the Day, and by this Sentence found himſelf rid of the Plague of a whole Neſt of Female Zealots, who having eſpouſed the young Woman's Cauſe, had combin'd together to ruin him out of Charity.

I don't pretend to aſſert that Surgeons may not commit ſome Faults: Where is the Man that may not be deceived? Where is the Profeſſion in which no Error is committed? And why are none but the Surgeons oblig'd to pay the Damage with Intereſt? There are other Profeſſions whoſe Faults are cover'd by the Earth, and of which no Mention is made. The Judges themſelves, who arbitrarily decide the Fate of Men, Are they not ſometimes miſtaken, and give an unjuſt Judgment againſt one, and make him loſe his Cauſe, and condemn the other, though innocent? Since then there is no Man but may commit Blunders, Why muſt not every one ſhare with the Surgeon in his Misfortune? Is he not ſufficiently puniſh'd when guilty of a Fault by the Loſs of his Reputation and Practice, but muſt he ſtill be perſecuted by Perſons who will continually perſiſt in forcing themſelves on him as Penſionaries? What belongs further to *Arteriotomy* is contain'd in the Firſt Volume, p. 374.

of the Varix, *and its Operation. From Mr.* Dionis's *Courſe of Chirurgical Operations.*

BY the Word *Varix* we underſtand a *Dilatation* of the *Veins*, which requires an Operation to cure it, which we call *Kirſotomy*, and is deriv'd from *Kirſos*, which ſignifies *Varix*, and *Temnein* to cut, and is the making of an Orifice in the *Varices* or *dilated* and *ſwoln Veins*.

Our Authors aſſign two Cauſes of the *Varix*: The one internal, when the Blood becomes too groſs by the Acquiſition of a too denſe Conſiſtence, and conſequently cannot glide in the Veins, but ſtopping in ſome of their Branches, coagulates, and thereby hinders the Paſſage of that which follows it, with continual preſſing in order to force its Way, dilates the *Vein*: The other, an external Cauſe, is that when by ſome Strain or violent Effort the Blood has extended the Membranes of a *Vein*, which forc'd them to form a ſmall Purſe that allows them Space and Liberty. If theſe Indiſpoſitions happen'd as frequently to Men as Women, and it was not obſervable that we only find them in the Thighs and Legs of thoſe who have had Children, we ſhould admit theſe two Cauſes: But the *Varices* being the Effects of Pregnancy, we are not to hunt after any other Cauſes beſides the Tumour produc'd by the *Matrix* when it contains a Child, whoſe ponderous Preſſure on the *Iliack Veins* hinders the Blood, which reaſcends from the lower Parts from entring the *Vena Cava*.

The *Veins* of the Thighs and Legs much more abound with *Valves* than thoſe of other Parts. They are ſo many Steps, which ſerve to help the Aſcenſion of the Blood, and facilitate its Return to its Source. When the Courſe of the Blood is ſtop'd by the Extenſion of the *Matrix*, it lies heavy on thoſe *Valvules*, dilates them, and produces ſmall Tumours of a Violet Colour, which we ſee riſe from Place to Place along the lower Extremities, which we call the *Varix* or *Varices*.

They are known by their Colour, which is a brown Violet, and by thruſting a Finger on the Tumour. When it is produc'd from Blood, it diſappears, becauſe it is driven along the Veſſel, but returns as ſoon as the Finger is taken off. They are always more ſwell'd in the Evening than the Morning, becauſe the Blood, when we are up, finds more Difficulty to reaſcend in a direct Line than when we are laid down, that Poſture being the moſt eaſy one for that Liquid to continue its Courſe. If then any Patient by a too wide Dilatation of the Blood begins to be in Pain, or the Veſſel burſts by an extreme Tenſion, we are to undertake the Cure.

Surgery preſents us with Three Ways of remedying this Inconvenience: The Firſt is by the Application of ſuch Aſtringents as are ſufficient to contract the too much extended Membranes of the Vein. Of this Sort are the fineſt Meal, Bean Flower, the Powders of Bole Armoniack, Dragon's Blood, and ſeal'd Earth, incorporated with the White of an Egg, and ſpread on a Bit of Linen, which is to be roll'd around the Leg, and be left there ſome Time without Removal; or elſe the *Emplaſtrum ad Herniam*, or Rupture Plaiſter, which is a ſtrong Aſtringent. The Second is by Bandage, which is perform'd two Ways, either with the Roller or Rolling Band, about three Fingers Breadth, and three Ells long, which we begin at the Foot with a Stirrup, and continue by ſwathing up to the Knee, having laid a large Bolſter moiſten'd in ſome Styptick Water on the riſing Swellings of the Veins, in order to preſs the heavier on thoſe Places than any others. The other Way is the making a Sort of fine Boot or

ſtraight

ſtraight Stocking, either of courſe Linen or Dog-skin, which reaches from the Ankle to the Knee, cut in Proportion to the Shape of the Leg, and provided with Oilet Holes to lace it on the Outſide of the Leg. This Bandage being tight lac'd, is worn under the Stocking in the Day-time, and left on in the Night, without incommoding the Leg. I prefer this laſt Way to the former, becauſe its Compreſſion is equal, it cannot looſen or ſlip, and that we are not oblig'd to take it off and put it on oftner than we pleaſe; and as for the former, though never ſo well faſten'd, the Circumvolutions continually ſlip up and down at the putting on or pulling off the Shoes, which obliges us frequently to roll them afreſh. The Third Way is by Inciſion, which conſiſts in the making of an Orifice on the *Varix* to evacuate it, which is alſo performed Two Ways.

The Firſt of which is that of opening the *Varix* with a Bleeding Lancet, making the Orifice lengthways in the Vein ſomewhat larger than that in Bleeding, in order to evacuate all the Blood contain'd in the Tumour; and if any of it be clotted, to get it out, and lay Aſtringents on the Part, or a ſmall Leaden Plate, to bind it up well, and leave it a long Time untouch'd, that is, for ſome Months, if the Patient is no longer incommoded with it.

The Second Method is very ancient, but little practis'd. 'Tis to mark with Ink the Skin of the *Varix* the Length of three Fingers Breadth, and then by pinching raiſe it up to hold one Side, and cauſe the other to be held by a Servant; then with an Inciſion Knife to cut the Skin at the mark'd Place, and having looſen'd it, to diſſect with a Penknife the *Varicous* Veſſels, to run a Needle under them threaded with two Threads, to cut the Threads near the Needle, and ſlip the one above the *Varix*, and the other below it, and tie them a large Inch diſtant from each other, in order to leave Room to cut the *Vein* betwixt the two Threads wi a Pair of Sciſſars, or leave it whole, as think fit. We dreſs this Wound like othe laying on it a ſmall Pledget cover'd with Defenſative for the firſt Day, then a Plaiſt and Bolſter rolling up with a Bandage two Ends, to keep it tight. We procure Suppuration by a Digeſtive, afterwards Time expect the falling off the two Thread and cleanſe, incarnate and cicatrize t Wound.

I wonder that the Ancients did not ord the Application of the *Actual Cautery* to t *Veins*, as is practis'd to Horſes, but conte themſelves with a Potential One; for th adviſe us to lay a great Stone on the *Vari* that when the Scar is fallen off, we ma procure the Generation of ſound Fleſh fill up the Variety in the Purſe of the *V rix*, and tell us it is a certain Way of c ring it.

Of all theſe Methods, the beſt is t ſtraight Stocking; for if we ſhould ver much rely on Aſtringents, and would mak uſe of them, they would prove of little E fect if not ſuſtain'd by Bandage: And b ſides, if a Leg were interſpers'd with ſever *Varices*, a good Bandage well made wou equally preſs on and take them all in, a may alone cure it without any other A ſiſtance.

But if the *Varix* is ſuch an one as abſ lutely requires opening, I adviſe doing the plain Way with the *Lancet*, and not t that cruel and painful Operation taught a practis'd by the Ancients. The Simple I ciſion preſerves the Uſe of the Vein, whi may, when the Orifice is once heal'd u afford the Blood its ordinary Courſe agai but by the old Way, the Ligatures cutti the Vein, the Blood is depriv'd of t Channel, though that Liquor has Occaſi for all its Ways to return to its Source, a the Conſequences of retrenching any of th cannot but be fatal.

Tab. I.

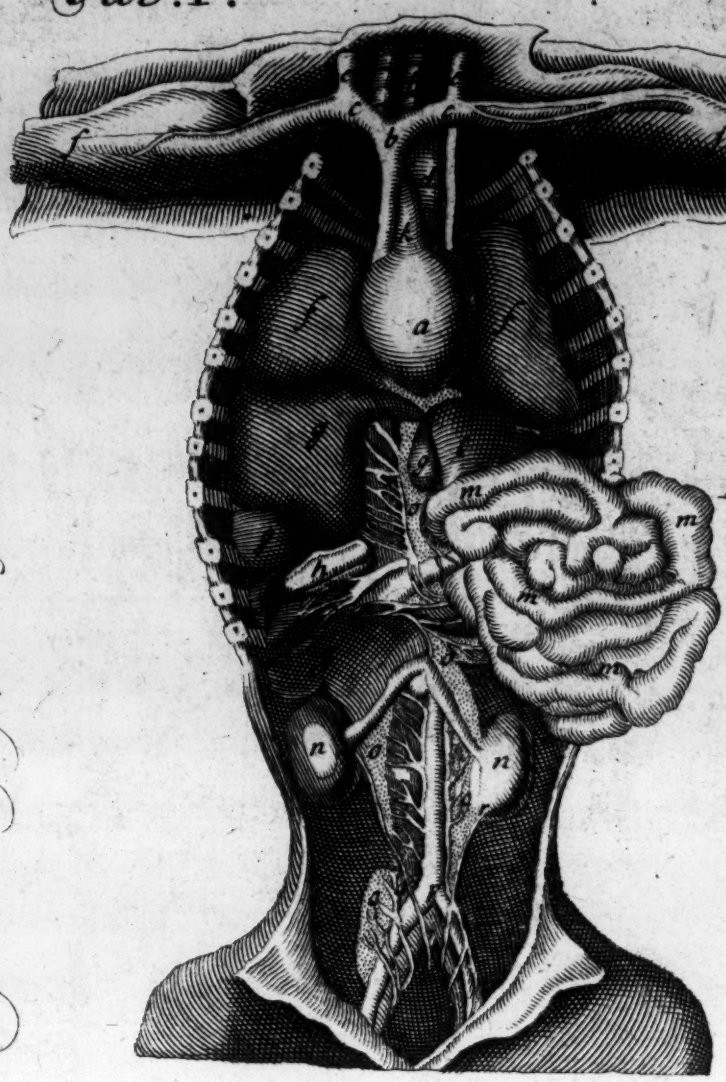


Fig. 1. Shews the Lymphaticks from Bartholin.

Fig. 3. several Vessels relating to the same parts from the same Author.

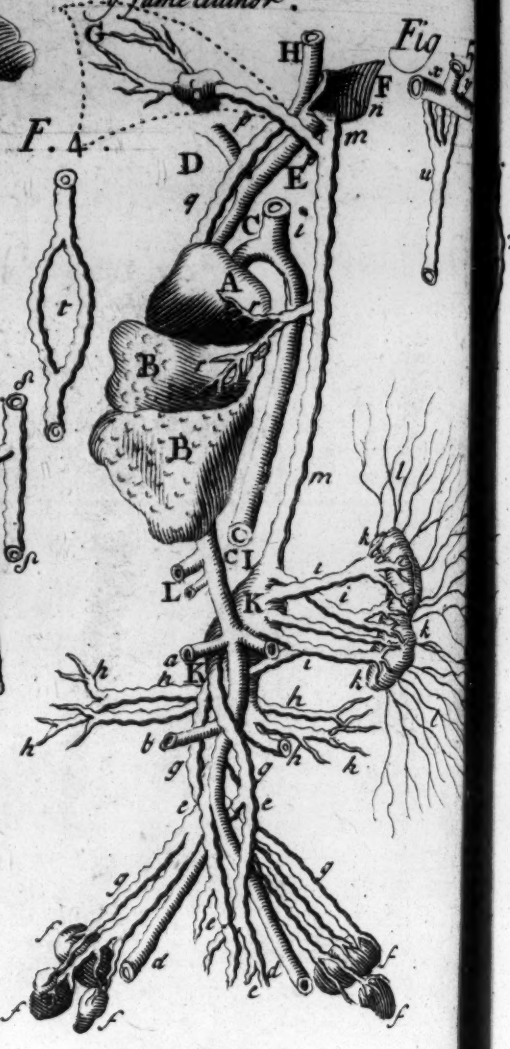


Fig. 7

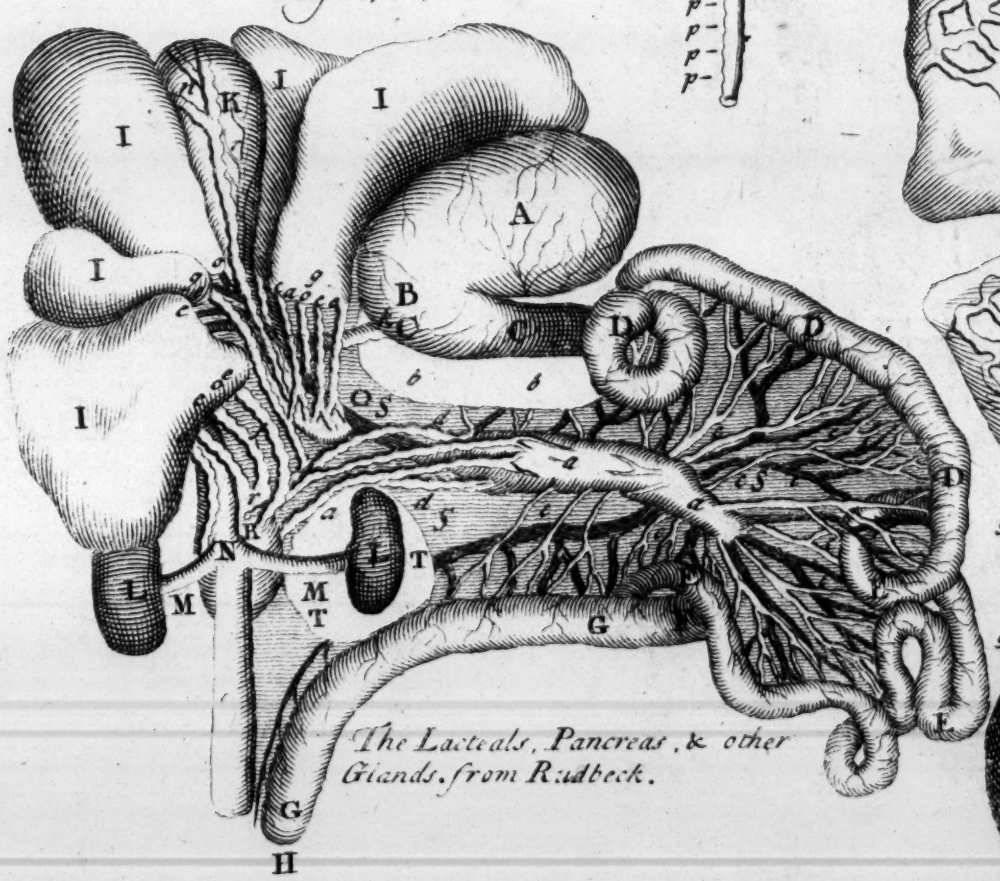


Fig. 2.

Fig. 9

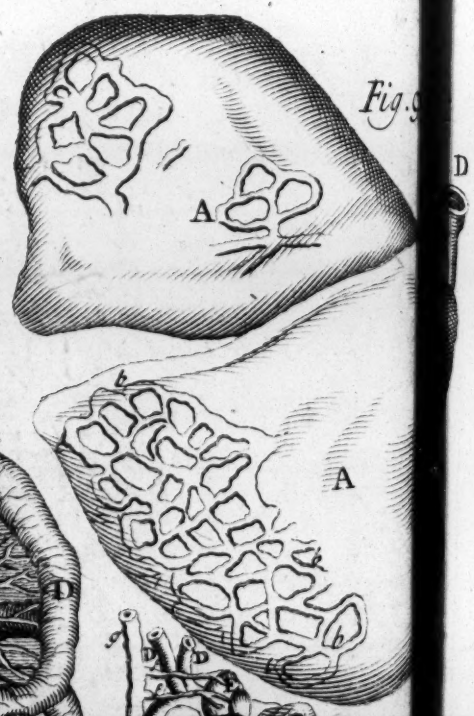


Fig. 8

The Lacteals, Pancreas, & other Glands, from Rudbeck.

Tab II

p. 431.

Fig. I. *shews ye Lymphaticks cut lengthways, wth their Valves. from Dr Ruysch.*

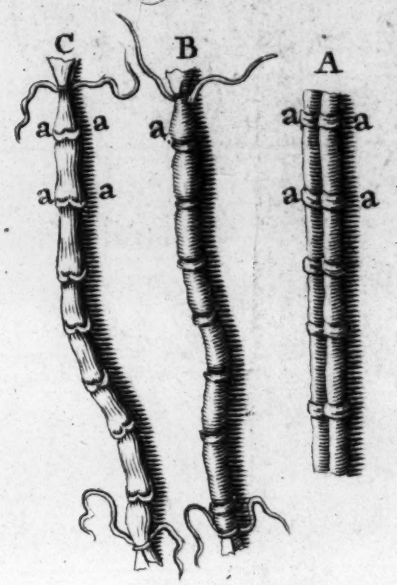


Fig. II. *shews ye Liver of a Horse from ye Concave part wth ye Lymphaticks & other Valves.*

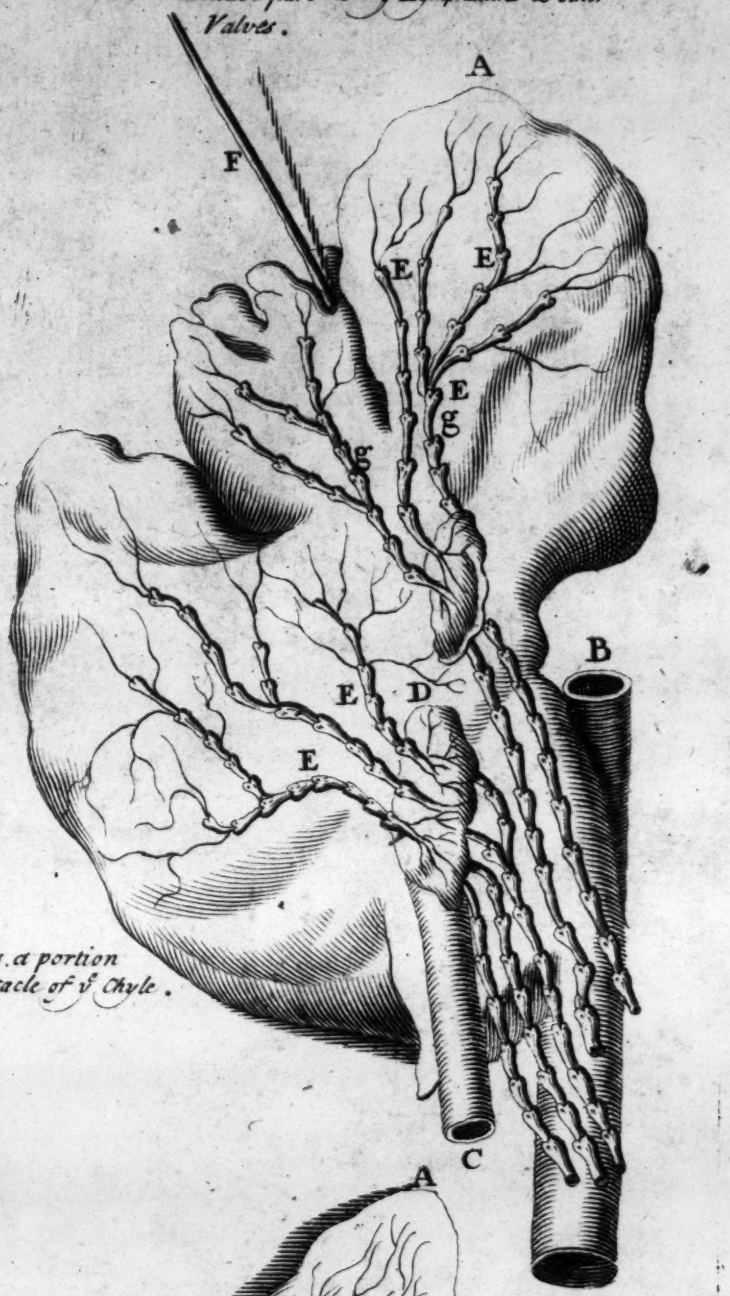


Fig. III. *shews ye lacteals a portion of ye Glands of ye Mesentery. & receptacle of ye Chyle.*

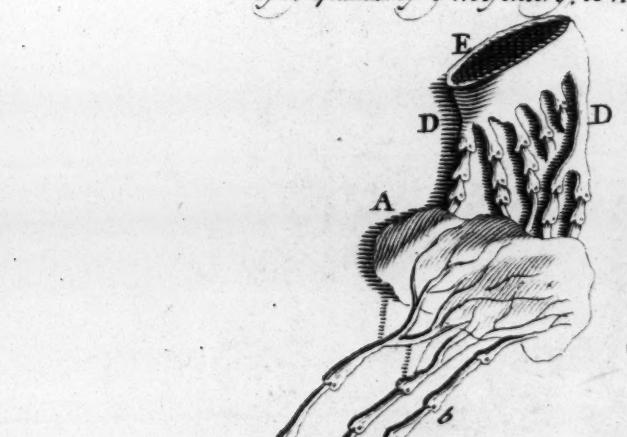


Fig. IV.

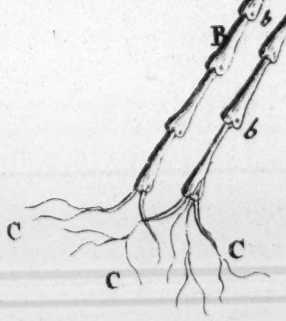


Fig. V.

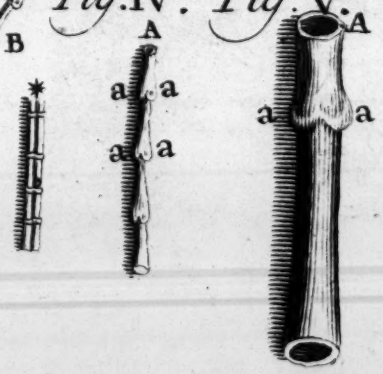


Fig. VI. *shews ye Spleen wth ye Lymphaticks & Blood Vessels tyd up.*

A *Deſcription of the Glands, Lacteals, Lymphe-ducts, &c. and their Uſes. From* Wharton, Peyerus, Aſellius, Pecquet, Nuck, Malpighius, Bartholin, Bidloe, *&c.*

A *General and Particular Diviſion of the Glands.*

THE Glands of the whole Body are divided into ſuch as are Perpetual and Adventitious, and thoſe again into ſuch as relate to the Individual, as well as ſuch as relate to the *Species*. Thoſe which relate to the Individual, beſide their uſual Office, are ſubdivided into thoſe which are found in the *Abdomen* or Lower Belly, ſuch as the Glands of the Meſentery, Caul and *Lumbares*, the Glands call'd the *Succenturiatæ*, the *Pancreas*, and the *Vagæ*. In the *Thorax* or Breaſt is the *Thymus* and the *Larynx*. About the Neck and Palate are Seven Pair, to wit, Two of the *Larynx*, thoſe call'd *Thyroids*, the numerous *Jugulars*, the *Parotids*, the *Series Concatenatarum*, the internal and external *Maxillares*, call'd the Salivatory Glands, the *Almonds* or *Tonſillæ*. In the Head are the *Conarion* or *Glandula Pinealis*, and the *Choroid Plexus* in the Brain, the Pituite Gland without the Brain, and the Lacrymal Caruncles in the Eye. In the Joints are the *Subaxillaries*, thoſe of the Groin, and about the Bendings of the Knee and Elbow.

In like Manner thoſe which relate to the *Species* are ſubdivided into what belong to the Male and Female. Such as are peculiar to the Male, are the *Teſtes* or Stones, the *Epididymis*, the *Paraſtatæ*, the *Medullæ deferentium glanduloſæ*, the *Veſicula ſeminalis*, the glandulous Fleſh of the nervous Bodies, and the *Glans* or Nut of the Yard. Such as are proper to the Female are, the *Teſtes ſui Generis*, the Uterine *Placenta*, the Wings or *Nymphæ*, the *Clitoris*, the Myrtle-form'd Caruncles, and the Breaſts. Laſtly, there are ſuch Glands as are Adventitious, or come by Accident; and theſe are either healthful or morbous. The Diſeas'd are either hanging, as Warts or Figs in the *Anus*, Nipples, a Bronchocele, a fleſhy *Hernia*, *&c.* or adhering and ſpread upon the Part, as *Strumæ's*, *Scrophulæ's* or King's Evils.

Of the Glands of the Meſentery, together with the Lacteal Veins, &c.

THE Meſentery, ſo call'd, becauſe it is in the Middle of the Inteſtines, and connects them together, conſiſts of a double Membrane, as elaborately deſcrib'd by *Fallopius* in his Anatomical Obſervations, and the accurate *Gliſſon* in his Account of the Liver, where it is ſaid to be variouſly interwoven with a Diverſity of Veſſels, Nerves, Arteries, Veins, Lacteals, adipoſe Ducts and Glands.

It has been uſually divided into two Parts, the *Meſaræum*, and *Meſocolon*. The firſt join'd to the *Inteſtina tenuia*, and the latter to the *craſſa*. This is a Diviſion of no great Moment, and therefore no further to be inſiſted on. The Origine of the Meſentery is deriv'd from the firſt and third *Vertebræ* of the Loins, where the Productions of the *Peritonæum* form two ſtrong Membranes, which, being join'd together, make the Meſentery. Between theſe two is a third Membrane, diſcover'd by the Learned Dr. *Wharton*, thicker than either of the other two, and perhaps (as ſome Anatomiſts think) properly to be look'd upon as the *adipoſe Membrane*, abounding both with Blood and adipoſe

adipoſe Veſſels, wherewith the Meſentery is generally well ſtor'd. The Figure of it is almoſt round, though for Want of Room, lying in Folds and Wrinkles, it ſeems but of ſmall Extent, yet when expanded, it is about four Ells in Circumference. It has interſpers'd up and down many Glands, which in a ſound State or good Condition of Health are uſually cover'd with Fat, moſt of which ſeldom exceed the Magnitude of a ſmall Nut, and are in Number and Poſition ſo various and uncertain, that it is in vain to attempt a certain Account of them as to theſe Particulars.

There are other Glands beſides theſe which *Bartholin* calls *Lumbares Lacteas*, though he erroneouſly aſſign'd their Uſe to be inſtead of a common Receptacle to receive the Chyle, and afterwards diſtribute it to the Blood, which he did not admit of in his Time, and which was afterwards diſcover'd by *Pecquet*; and theſe Glands (ſaith the ſame *Bartholin*) are ſeated under the Centre of the Meſentery, beneath the Cæliack and Emulgents, about the *Vertebræ* of the Loins, amongſt the Muſcles of the *Pſoas*, almoſt in the middle Region, betwixt the Kidneys and *Capſulæ atrabilariæ*.

In ſome Brutes, eſpecially Dogs, there is a large Gland found in the Middle of the Meſentery, which by *Aſellius* was call'd the *Pancreas*, to which moſt of the Lacteal Veſſels reſort, and from whence the Chyle is convey'd by large Trunks, but not ſo numerous as thoſe before ſpoken of, which have their Riſe immediately from the Inteſtines, and are call'd *Lactea ſecundi Generis*, or Lacteals of a ſecond or another Sort, which Diviſion will ſcarcely be made out in Men by any viſible Diſtinction, their Lacteals not being gather'd ſo uniformly to one Part, but diſtributed indifferently to all the Glands of the Meſentery.

From each of the *Glandulæ Lumbares*, mention'd before from *Bartholin*, proceeds a ſmall Branch, and both are united together to make the great Lacteal Vein or Thoraick Canal. This Tube conveys the Chyle along the *Vertebræ* of the Back to the Left Subclavian Vein, from whence it paſſeth into the Aſcending Trunk of the *Vena Cava*, and deſcends into the Right Ventricle of the Heart, where it aſſumes the Form of Blood, from whence it paſſes to the Lungs through the Pulmonary Artery, then returns to the Heart through the Pulmonary Vein, and goes forth again through the Left Ventricle of the Heart, between the *Aorta* or great Artery, to be afterwards diſtributed to all the Parts of the Body. Thus the Chyle is diſcharg'd into the Blood, and circulates with it, till it is aſſimilated and converted into its Subſtance.

The Lacteal Veſſels or Veins proceed in great Number from the *Inteſtina tenuia* or ſmall Guts, eſpecially the *Jejunum*, from whence they ariſe in greater Number than from the reſt. It is yet a Doubt among the Anatomiſts, whether the *Inteſtina craſſa* or large Guts afford any or not. The Impoſſibility of a humane Diſſection proper for ſuch an Inquiry, gives no Room either to affirm or deny: But the Contents of the *Inteſtina craſſa* ſeem not likely to afford much Chyle, and therefore, if there be any Lacteals, 'tis probable they are but few. In Brutes, if they are diſſected at a reaſonable Time, that is to ſay, two or three Hours after feeding, according to the Nature of their Food, theſe chyliferous Veſſels may be ſeen very tumid and white, and if wounded, the Chyle flows plentifully from them, but if inſpected when the Stomach of the Animal has been any Time empty, they appear like Lymphaticks, viſible indeed, but fill'd with a tranſparent Liquor. That the Lacteals have a Communication from the Cavities of the Inteſtines, is demonſtrated by their Contents the Chyle. How their Pores are diſpos'd to receive it, has not yet been diſcover'd; and it is to be fear'd, Microſcopes will not be able to ſhow us their Paſſages in the villous Coat of the Inteſtines, nor is there any Way yet known to us whereby we can fill the Lacteals from the Cavities of the Guts after Death. We may be allow'd to imagine, that their Entrance into the Guts is oblique, not unlike that of the Ureters, ſince neither Wine nor Liquors can paſs them from thence. Neither can their Paſſages be altogether like the Ureters in the Bladder, becauſe we can no more make Quickſilver paſs from the Trunks of the Lacteal Veſſels into the Guts, than from the Guts into them. Since therefore thoſe Pores of the Lacteals can only receive any Thing in

in the living State, we may be allow'd to imagine, the Periſtaltick Motion of the Guts ſo diſpoſes them, that they then only receive the Chyle. This we think may be done by the circular and longitudinal Fibres of the Inteſtines, ſtill applying the internal Coat of the Guts to their Contents, by which Means its Pores abſorb the Chyle from the excrementitious Part.

After the Chyle is got into the Lacteals, it meets with the *Lympha* from the Arteries in the Guts, before it arrives in the Trunks of the Lacteals in the Meſentery; though this Communication between the Arteries and the Lacteals may be argued from the Lacteals having *Lympha* always in them when they are not charg'd with Chyle. Yet we are beholding to an Experiment for rendring it more certain, for by injecting Mercury into the Meſenterick Arteries, not only the Meſenterick Veins, but Lacteals alſo, are fill'd with it, and the Mercury may be driven on to the Glands of the *Meſentery*. Dogs have a large Gland in the Middle of this, which (as before obſerv'd) is call'd the *Pancreas Aſellii*, in which moſt, if not all, the Lacteals terminate, and thence proceed in fewer, but much larger, Trunks to the common Receptacle diſcover'd by *Pecquet*. But in Men no ſuch Gland being ordinarily found, nor live Diſſections permitted, the *Vaſa Lactea ſecundi Generis* remain diſputable; though the Receptacle and Thoracick Duct, which are as large as in any Animals whatſoever, in Proportion to the Magnitude of their Bodies, leave us no Room to doubt of the ſame Way of Conveyance, though probably by more or leſs Channels between the Glands and the Receptacle for the Reaſons already given. Theſe chyliferous Veſſels opening with their little Mouths into the Inteſtines, receive the prepared fluid Part of the Aliment, and appear at Intervals as it were girt and ſtraightned, and when preſs'd, do not admit of a Reflux towards the Inteſtines, though the Liquor be eaſily propell'd towards the Glands; which argues that there are Valves in them, though they are too minute to have the Structure or Form of them examin'd.

The *Receptaculum Chyli* lies near the Left Kidney, under the Emulgent and great Artery. Its Capacity and Extent has been found in humane Bodies to be much larger than hitherto obſerv'd. Mr. *Cowper* has given us a Figure of a Preparation of it, fill'd with Mercury, which he has ſtill by him, conſiſting of three large Trunks, two of which are more than a Quarter of an Inch in their Diameters; the third is ſomewhat leſs. This Diviſion of it he thinks is more requiſite in humane Bodies than in *Quadrupeds*, on the account of their Poſition: The latter being Horizontal, the Chyle and *Lympha* does more readily paſs from one large Receiver into this Thoracick Duct; but in Man its Progreſs being perpendicularly Aſcending, it ſeems neceſſary to divide this Receptacle of Chyle, as we ſee in the Hydroſtatical Engines, in order to take off that Reſiſtance which the Weight of the Chyle would occaſion, were it contain'd in one common Receiver.

Its *Exit* is upwards in the *Thorax*, from whence it is call'd the *Ductus Thoracicus*, and it ends in the *Subclavian Vein*. Its Membrane is the ſame with that of the *Receptaculum*. Beſides that in the *Thorax*, it ſeems to be furniſh'd with another Integument from the *Pleura*. A little more than the third Part of its Way, or about the Middle, it begins to divaricate, but after a Progreſs of about the Breadth of two *Vertebræ*, it unites again, and at laſt diſcharges it ſelf with an oblique Inſertion into the Subclavian, at which is plac'd a Valve, as there are in divers other Places in the Tract of it, which appear, as in the Lacteals, plainer by the Nodes, and the Denial of the Regreſs of the Liquor when preſs'd, than from any Demonſtration that can be made to the Eye. From hence by the Subclavian the Chyle is deliver'd to the *Cava*, and ſo to the Heart, and thence again to all the Body by Means of the Arteries.

Of the Glands of the Omentum *or Caul. From* Wharton, Malpighius, *&c.*

THE Glands of the Caul are very like thoſe of the *Meſentery* according to *Wharton*, whereof there are two Sorts in this Membrane, to wit, one larger, that is ſeated near the *Pylorus*. Theſe Glands have Lacteals

primi Generis, that riſe from the Bottom of the Stomach, and run along the Length of the Caul. The other Sort is much leſs, being plac'd towards the Spleen, and is ſometimes double, triple or quadruple: But beſides theſe, *Bartholin* makes Mention of ſeveral other Glands in the *Abdomen*. In the Caul (ſays he) there are Abundance of Glands which ſeparate a fæculent Moiſture. *Riolan* corrects this Obſervation, and ſays, the *Adeps* is indurated in ſeveral Places to the very Diviſion of the Veſſels, and ſeem to reſemble the Figure and Uſe of the Glands. I muſt confeſs, ſaith *Wharton*, I have ſeen this Fat of the Caul that *Bartholin* takes for the Glands, and *Riolan* for harden'd Fat; but I never could clearly diſtinguiſh the Subſtance of theſe Protuberances from the other Fat of the Caul, therefore cannot (ſays he) acknowledge *Riolan*'s Induration, or *Bartholin*'s glandulous Subſtance.

The Fat here, as in the *Membrana adipoſa*, is either ſeparated from the *Loculi* or *adipoſe Cells*, and from thence deliver'd into the *Ductus adipoſi*, or elſe is brought by them into theſe adipoſe Cells; for the extreme Fineneſs and Tranſparency of theſe Veſſels, as well as of other Liquor, renders it exceeding difficult to trace their Origine or Courſe; and indeed it remains ſomething doubtful whether they be hollow and real Ducts or not, and whether they be only Fibres, ſuch as are obſerv'd in the Spleen, along which the liquid Fat does as it were drill its Way, as the eaſieſt it can find.

The accurate *Malpighius*, the firſt nice Obſerver of this Part, and Diſcoverer of theſe Ducts, inclines to the former Opinion, and indeed it is hard to entertain any other. All that is certain concerning them is, that they diſcharge themſelves or terminate in little oily Globules of Fat, concerning the further Uſe and Progreſs of which much remains ſtill to be diſcover'd. *Malpighius* himſelf ſtarts ſeveral ingenious Doubts, which he recommends to further Proſecution: Firſt, Whether theſe adipoſe Ducts be not propagated from the Fibres which abound in the Spleen, or thoſe Fibres from them? One of which he is induced to ſuſpect from the Similitude of theſe Fibres to thoſe which he finds in the *Omentum*, and from the Communication and Continuati of ſome Fibres which he obſerves betw them, whereas thoſe of the Spleen ſeem have none with the Blood Veſſels.

His other Doubt is, Whether there m not yet be any undiſcover'd Communi tion between the *Omentum* and the *Memb na adipoſa*? And whether, by Means of Connexion with the Back, its Veſſels m not be propagated into every Region of Body by the Mediation of this Membra which is ſpread over it, and ſo be as it w the common Root of the Fat all over Body? Neither is he more certain whence this *Omentum* is ſupply'd; for beſides the Spleen before-mention'd, *Malpigh* offers to our Conſideration two other Fountains, to wit, the Stomach, and the Gla of the Body. The firſt he ſuſpects upon Account of the Connexion of the *Omen* with it; and the latter, upon Obſervat that they are generally accompany'd w Fat, and from the Taſte of them, whi he thinks they are beholden to the Fat fo

Of the Pancreatick *Gland.*

THE *Pancreas* is a conglomerate Gla ſituate near the firſt *Vertebræ* of Loins, at the Bottom of the Stomach, o the hinder Part of it, adhering at its thi Extreme to the *Duodenum*, and from thence extended towards the Spleen. It conſiſts of innumerable ſmall Glands, which, though ſeparately being very firm, cohere but looſely together, and therefore make the whole Body of it ſeem lax. Theſe Glands are colligated as well by the Veſſels, as by a Membrane proper to every one of them, and altogether are cloath'd with a very thin Membrane from the *Peritonæum*, which, if you blow into the excretory Duct of the *Pancreas*, will let out the Air at ſeveral Places.

It has a peculiar Duct, firſt diſcover'd by *Wirtſungius*, and therefore call'd by his Name *Ductus Wirtſungianus*. This Duct is about the Bigneſs of a Raven's Quill near the Inteſtine, though more ſlender in Parts farther from it. It is ordinarily accounted and deſcrib'd as a ſingle Duct; but *De* takes Notice that he has ſeen it double ſometimes in Men, and ſays, it is generally ſo in

in Pheasants, and many other Fowls: But it has happen'd to be so in most, if not all, the humane Bodies and Dogs that I have examin'd about it, since I took Notice of that Suggestion, says Dr. *Drake*. It empties it self into the *Duodenum* generally by two several Mouths, one only of which is taken Notice of by Anatomists, and opens it self four or five Fingers Breadth below the *Pylorus*, and not seldom at the same *Foramen* with the *Ductus communis Choledochus*. The other is somewhat lower, but at an uncertain Distance. It has no *Papilla*, and is much smaller than the other, but is easily discover'd by blowing into the larger.

There are various Opinions about the Use of this *Gland*. Some think it serves for the Preparation and Distribution of the *Chyle*: Others, that it supplies a Ferment to the Stomach: Others, that it purges the Recrement of the *Chyle*: Others, that it is a biliary Vesicle to the Spleen: But these labour under manifest and great Difficulties. The first Opinion, that assigns it for the Preparation and Distribution of the Chyle, may be ascrib'd to an Error of *Asellius*, who carries the Lacteals to the *Pancreas*; but we have shown that the *Lacteal Veins* do not terminate here, much less are they employ'd in bringing the Chyle into the *Spleen*. The second Opinion is that of *Horstius*, who thinks that this Part furnishes a Ferment for the Stomach, though there is no Duct lies open to the Stomach, neither is there any Humour of that Nature generated there. The third Opinion is ascrib'd to *Licetus*, *Riolan* and *Vestingius*, to wit, that this Part carries off or excerns the Recrement of the Chyle; but if the Chyle never enters this Part, as we have prov'd it does not, it would be ridiculous to suppose any Secretion made here. The fourth Opinion is that of *Bartholin*, that this Part serves as a Gall Bladder to the Spleen, and purges the Bile, whether generated in the *Pancreas* or Spleen. This Opinion is subject to several Errors; for first it ascribes Sanguification to the Liver; then it supposes that the Spleen supplies the Office of the Liver; and last of all, that the *Pancreas* is plac'd instead of the Gall Bladder, and to perform the same Functions, and so to have a secondary Power of making Blood, when indeed neither the Liver, nor the Spleen, nor the *Pancreas*, have any Thing to do in that Secretion; for the Thoracick Ducts are sufficient to convince us that Sanguification is not perform'd in those Parts, neither is the Chyle transmitted to them, but directly to the Subclavian Veins. The Figure of the *Pancreas* is somewhat like that of a Dog's Tongue, but longer, being usually about eight or nine Fingers Breadth long, and about two and a half broad, and about one thick. Its Weight, according to *Wharton* and *De Graef*, is about four or five Ounces. Its Arteries come from the *Cæliack*, both Right and Left. Its Veins go to the *Porta*. The Nerves come from the *Hepatick Plexus*, which is form'd under the *Liver* of some Branches of the *Intercostals*.

Of the Glands and Lymphaticks of the Spleen.

THE Spleen is a soft spungy *Viscus* or Bowel, situated in the Left *Hypochondrium*, between the Bastard Ribs and the Stomach. The Size is so very various, that it is not precisely determinable. It is join'd by the Caul, and by that and the Blood Vessels to the Stomach and Left Kidney, and sometimes the upper Part of it sticks to the *Diaphragm*. It is cover'd with two Coats, of which the external is deriv'd from the *Peritonæum*. The inner Coat consists of Fibres very curiously interwoven, from which it sends over innumerable Threads from one Side to the other.

From this Coat very probably are deriv'd those Multiplicity of Cells, or little Bladders, which make up the main Bulk of the Spleen; though *Malpighius* rather thinks them to arise from the Veinous Duct, a Difference not very material. These Cells are for Number, Magnitude and Figure various and indeterminate, and best shewn by blowing up the Spleen through the Trunk of the Vein, and then laying a Varnish upon it, and drying it in the open Air; after which cutting it, the Cells remaining distended, shew their Figure and Capacity. These Cells communicate with one another, and exonerate themselves into the Trunk of the Vein.

The Inside of these Cells is furnish'd with divers Glands according to *Malpighius*, which adhering to one another, six, seven, eight, or more together, form a Sort of small conglomerate Glands, in which the Arteries and Nerves seem to terminate. Their Existence is however very questionable, as not appearing plainly here, nor in the *Penis* at all, whose Structure is the same, but by no Body said to be glandulous. The Spleen abounds with Lymphæducts, in Proportion to its Magnitude, equally, if not more than any Part of the Body; but these do not so plainly appear, unless in live Dissections, with a Ligature upon the Vessels, or on blowing into the Veins.

Of the Glands of the Liver, and its Lymphaticks.

THE Liver is a large glandulous *Viscus* or Bowel, of a bloodish Red Colour, situated immediately under the *Diaphragm* in the Right *Hypochondrium*, which it almost fills, and thence stretching it self over the Right Side of the Stomach, towards the Left *Hypochondrium*, reaches beyond the *Cartilago Ensiformis*, growing gradually thinner and narrower. The upper Part of it is convex, and perfectly smooth or polish'd; the under, concave, and somewhat more uneven, having four large Fissures. Its Figure is somewhat round, with thin Edges, not altogether even, but notch'd in some Places. Its Size is various, according to the different Subjects and Proportion of the Body that it belongs to.

Its Substance is vascular and glandulous, which latter Part is very soft and friable, and pretty easily scrap'd off from the Vessels, to which the Glands every where adhere as it were in Bunches, which has made Anatomists call the considerable ones the internal Lobes of the Liver. The Glands adhering thus to the Vessels, and constituting those Lobes, are wrap'd up together in proper Membranes, whence is this Appearance of distinct Lobes. Every one of these Glands, according to the Observation of *Malpighius*, is compos'd of six unequal Sides or Faces, which are better to be seen in Fishes, and some other of those Animals which are call'd imperfect, than in Men, or Anim of a larger Kind.

These Glands are each of them cloa with their proper Membrane, and have an excretory Duct, several of which j ing together, form little Trunks, which all along with the Branches of the *Po* and these again uniting, form larger Tru which are always found full of Bile, make the *Porus bilarius*, which being di buted all over the Liver, receives in Manner foregoing the Bile, which is sepa ted by these Glands, and terminating in *Meatus Hepaticus*, and that in the *Du communis*, at length discharges the Bile i the *Duodenum*.

Besides this Discharge, which is suppo to be the great one, it likewise delivers P of its Bile into the Gall Bladder, by a D pretended to be discover'd first by Mons *Perrault*, and by him call'd *Ductus Cyst-he ticus*, tho' long before describ'd by Dr. *Gli son*, but in one Respect defectively, in t he does not take Notice of any immedi Communication between the *Porus bila* and the Gall Bladder by Means of t Duct. *Verheyen*, according to the Cou of the Bile through that Duct from the *rus bilarius*, reverses the former Name, a more properly calls it *Hepati-cysticus*, and a serts Dr. *Glisson*'s Right to that Discove which perhaps the Doctor had otherwi lost for Want of dignifying it with a di stinct Name, for he barely calls it a Trun

The Way to discover this Duct, is to tie the *Meatus Cysticus*, and then to blow strongly into the *Ductus communis*, by which Means the Air will come round by this Duct into the Gall Bladder, which will be thereby blown up: And if afterwards the Bladder and the *Meatus Cysticus* from the Ligature upwards be laid open, the Blast will be observ'd to penetrate not only into the Bladder, but likewise into the *Meatus* it self, by several little Apertures. *Verheyen*, in the Prosecution of this Discovery, has observ'd in the Gall Bladder of an Ox not only one, but three Orifices opening into it, by blowing into each of which, the *Ductus* penetrated the *Ductus Hepaticus*, and offering to trace them, he found that two of them join'd together before they reach'd the *Hepatick Duct*, and enter'd into it with a single

ingle Stem and Orifice. The other he obſerv'd to be join'd juſt at its Orifice into the Gall Bladder by another Duct, whoſe Roots were diſpers'd through the Subſtance of the Liver. In another Subject, the ſame Author ſays he diſcover'd four *Hepati-cyſtick* Ducts, through each of which he blew into the Gall Bladder. In farther Proof of this Diſcovery, he examin'd the Gall Bladder of ſeveral Oxen, and never fail'd of finding one or two ſuch Orifices opening into the *Veſicula Fellis*.

The Membranes of the Gall Bladder we reckon'd five, an outer or common one from the *Peritonæum*, an inner one on that Side which adheres to the Liver, from the *Capſula* of the *Porta*, and of the *Porus bilarius*, beſides three proper. The exterior of the proper Membranes conſiſts of a great Number of white Fibres, irregularly interwoven with a great Number of Veſſels, upon the Account of which it is call'd the *vaſculous Coat*. The ſecond conſiſts of a Sort of fleſhy Fibres of a double Order, and therefore it is call'd the *muſcular Coat*. The third or inner Coat, and which is very much wrinkled, conſiſts of a great Number of Glands, like the *Cruſta villoſa* of the Stomach, and is therefore properly call'd its glandulous Coat. It ſeparates a *Mucus*, which lining all the Inſide of this Bladder, ſerves to defend it from the extreme Acrimony of the Bile, which is in this Part abundantly thinner, and much more acrimonious, than in the *Porus bilarius*.

The *Lymphæducts* in this Bowel are numerous, but not eaſily obſerv'd in a humane Subject, for Want of live Diſſections, or at leaſt whilſt the Subject is warm; but in other Animals, which may be cut open alive, if a Ligature be laid upon the *Porta*, and the bilary Ducts, they become very conſpicuous; but by blowing into the Arteries or Gall Ducts, they may be made viſible, and appear very numerous on the concave Surface of the Liver, where they run to a Lymphatick Gland, from which the exporting Lymphæducts ariſe, and employ themſelves into the *Receptaculum Chyli*.

Of the Glands of the Kidneys, and the Glandulæ Renales.

THE Subſtance of the Kidneys is made up of Glands and Veſſels of ſeveral Kinds, the exterior Part of which carries a very different Face from the interior; the exterior conſiſting moſtly of Glands, and very fine Ramifications of the Blood Veſſels, which latter ſhooting their Branches round, like Lines drawn from a Centre, form divers little elegant Star-like Figures, which cutting the Kidney longitudinally, ſhew themſelves very readily. This Part of the Subſtance is in Colour reddiſh, and is about a third Part of the Depth of the *Kidney*.

Between the Trunks of the *Aorta* and *Cava*, and the Kidneys, a little above the Emulgents, are ſituated two Glands of an irregular uncertain Figure, call'd *Glandulæ Renales*, *Capſulæ Atrabilariæ*, *Renes Succenturiati*, which in a *Fœtus* are almoſt equal to the Kidneys themſelves in Magnitude, but gradually ſhrink, till in adult Perſons they come to be very inconſiderable. They have their Blood Veſſels ſometimes from the Emulgents and Nerves, from the *Plexus Renalis*. They have a Cavity, which is uſually fill'd with a blackiſh Liquor; but no proper excretory Duct having been yet diſcover'd, we remain in the Dark as to the Uſe of theſe Glands.

Beſides theſe *Glandulæ Renales*, there are in the Guts a great Number of Glands, which in the *Inteſtina tenuia* are gather'd together in Heaps, as it were like Bunches of Grapes. In theſe Inteſtines they are very ſmall, and were it not for their Concervations, ſcarce remarkable: But in the *Inteſtina craſſa* they are much larger, not gather'd like others, but diſpers'd, and though very numerous, come under the Denomination of *Solitary Glands*.

Theſe *Glands* diſcharge a Liquor into the Inteſtines, whether ordinarily for any Thing more than Lubrication of the Guts, and diluting their Contents, I will not determine; though through theſe ſeems the greateſt Part of the Diſcharge to be made, which, either upon

upon extraordinary Fluxes, or upon the Administration of Catharticks, we have frequent Occasion to observe.

Of the Gland Thymus.

THE *Thymus* is a conglomerate Gland, situate in the upper Part of the *Thorax*, just below the Division of the Subclavian Arteries and Veins, in a *Fœtus*, and in Children new born, large, soft and white, abundantly bigger than in Adults. It has Arteries and Veins from the *Carotids* and *Jugulars*, and Nerves from the *Par vagum*. Over the Surface of it run several Lymphaticks, but whether they come from the interior Substance of it, is not quite so plain in Fact, as it is from Reason credible.

It is often found with a milky Juice in new born Children. Its *Lymphæducts* have no Valves in them; for by injecting a Liquid into the *Ductus Thoracicus*, it will pass into the *Lymphæducts* of the *Thymus*. The like has been observ'd by injecting Wax. The *Thymus* has been therefore thought to be a Kind of *Diverticulum* to the Chyle in the Thoracick Duct when overcharg'd, as well as to receive the *Lympha* from the adjacent Parts, in order to transmit it to the Thoracick Duct. The Space it takes up in the Cavity of the *Thorax* of a *Fœtus*, must be very much crowded when the Lungs become distended by Respiration; whence it is that the neighbouring Lymphatick Glands, as those about the Subclavian and the Internal Jugular Veins, are larger in the Adult, when the *Thymus* is less; and *Vice versa*, less in the *Fœtus* in Proportion, when the *Thymus* is largest.

Of the Glands united to the Oesophagus *or Gullet.*

THere are in the *Thorax* other Glands, especially two, and sometimes more, ascrib'd by Authors to be peculiar to the *Oesophagus*, which are contain'd in the hind Part, between the Gullet and the *Vertebræ* of the *Thorax*, that are scarcely discoverable to the most diligent Inquirer. The first of that Kind that discover'd them, was the accurate *Vesalius*. Their Substance is glandulous, soft and fungous. The Colour chiefly pale, seldom admits of a blo Tinge, but is sometimes livid. They situate in the hind Part, about the Mi of the Gullet and fifth *Vertebræ* of the *rax*, to wit, where it gives Way for Trunk of the *Aorta*, and tends to the Ri In that very Place these Glands stick c to the *Oesophagus*. The Bigness of on them appears like a small Kidney Bean, so times bigger, but often less; when they are more in Number, to wit, four or five. They likewise resemble a Kidney B in Shape, only that the Figure of the Kidney is inverted, *viz.* the Convexity is tur inwardly, and the Concavity outwar They have Veins and Arteries from the Coronary Branches, Nerves from the sixth P and the twelfth Pair of the *Vertebræ*, be first wound about the Gullet; and last Lymphæduct, that discharges it self into common chyliferous Duct.

The Anatomists usually assign'd two Us to these Glands: The first were to defend the *Oesophagus* from the Hardness of the *Vertebræ*, and to keep the Gullet at a due Distance open. The second, that the Gullet might be constantly moisten'd, and the Meat slide down easier in swallowing. As to the first, I see no Reason why the Gullet should be in any Danger of receiving Hurt in this Place, more than passing through other Parts of the Neck and *Thorax*. Besides, the interior Part of the Spine is not so rough as to hurt the Gullet, especially when cloath'd with the *Periosteum* and *Pleura*, that render it smooth. But the last Use is to moisten the interior Superficies of the *Oesophagus*, that it may facilitate the swallowing of the Meat, which is so far from being consonant to the Formation of those Parts, that there are Vessels and Glands peculiarly adapted for the moistening of the Gullet, to wit, the Maxillary Glands and the Salivatory Channel, the *Tonsillæ* and a Lymphæduct.

Therefore I shall assign you the true Use of these Glands of the Gullet, they having (as I have said) Nerves from the sixth Pair and the twelfth Pair of the *Vertebræ* of the Back, likewise a Lymphæduct, as well from the *Pericardium* as the neighbouring Parts. From these Vessels the Use of these Glands may

may be the better collected; For why muſt the Lymphæducts be convey'd through theſe Parts, if the Liquor they convey has no Commerce with them? Therefore I reckon theſe Glands ſerve for a certain Secretion, namely, that of the *Lympha* that runs thro' them, to ſeparate a milder and apter Juice for the Nutrition of the Parts, and to depoſite the auſterer *Lympha* by its proper Channel into the common chiliferous Duct.

Of the Thyroid Glands.

THE General Method of the Glands propos'd from the Beginning, lead us now to thoſe which are found about the Neck and Palate, to wit, the *Thyroid*, *Jugular*, *Parotid*, and *Maxillary* both internal and external, together with the *Tonſillæ*, *&c.* Firſt the Thyroid Glands appear, which are plac'd about the lower Situation of the *Larynx*, at the Sides of the *Thyroid* Cartilages, and ſome of the firſt Rings of the *aſpera Arteria*, with which Parts they immediately reſt, but ſo as they may be eaſily ſeparated, except it is where they pertinaciouſly adhere about the Head and Tail thereof, in which Places they enter in and go out.

The Figure of theſe Glands has ſome Reſemblance to a long Fig or Pear, but on that Side towards the *aſpera Arteria* they are ſomething hollow'd: On the contrary Side they acuminate, and upwards are made thicker, approaching almoſt to an oval Figure, where, betwixt two lateral Prominences, they ſwell externally as it were into a little Head. Authors, in deſcribing the Subſtance of theſe Glands, ſeem to make them equal; for they ſay they are large Glands, and almoſt fungous, beſides being thick, groſs, and as it were fleſhy; but if they are fleſhy, how ſhould they be fungous? For what is fungous, muſt in like Manner be porous and ſpungy.

As to the Size of theſe Glands, in a Man of about 28 Years old, either of them weigh'd ſeven Drams and a half; but the *Jugulars*, which were fifteen in Number, did not exceed two Drams. One of the *Parotid* in the ſame Man weigh'd half an Ounce and half a Dram, one of the internal *Maxillaries* two Drams and a half, the *Thymus* ſcarce a Dram and a half. In a Calf of the laſt Month, before Exclaſion, each of the *Thyroids* did but weigh one Dram, the *Jugulars* in their whole Courſe are ſcarce to be number'd, the uppermoſt of which weigh'd one Dram, the *Parotid* two Drams, the internal *Maxillary* only three Drams, the *Thymus* of the ſame fourteen Ounces. In an Ox, each of the *Thyroids* did not exceed half an Ounce and a Scruple, the internal *Maxillary* nine Ounces, and the *Thymus* weigh'd eight Ounces: Therefore you may ſee what a vaſt deal the *Maxillary Gland* exceeded that of the *Thyroids* in an Ox.

The Uſe of theſe Glands firſt and principally ſeem to be deſign'd for carrying off certain ſuperfluous Liquids from the recurring Nerve, and to throw them into the Veinous Channels by their proper Lymphæducts: In the next Place, to nouriſh the Cartilages by their warmer Juices: Thirdly, to conduce to the Lubrication of the *Larynx*, and by that Means to render the Voice more ſonorous and ſweet: And laſtly, to contribute to the Roundneſs and Ornament of the Neck, by ſupplying the Vacuities about the *Larynx*, and bringing the protuberant Parts to a greater Smoothneſs, eſpecially in Women, who from hence have their Necks made more even, round and beautiful.

In the next Place we muſt conſider the *Jugular Glands*, which ſeem yet to want a Name; but becauſe they are ſeated about the Jugular Veſſels, are call'd *Jugulars*. I found them to be ſometimes fourteen, and ſometimes fifteen, though they vary from both theſe Numbers, and may properly be ſaid to be uncertain. Some are larger than others; for their Size encreaſes from that of a Coriander Seed to that of a Bean. Some are forward, ſome lie backward, ſome higher, others lower. The ſuperior of them almoſt reach to the Styliform Proceſs, and to the lower and upper Seat of the Maxillaries; the inferior juſt to the Sides of the Thyroids, betwixt the Spine and the Thoracick Veſſels, and deſcend into the *Thymus* and the *Thorax*, which makes it in Adults often be taken for the *Thymus* it ſelf. Thoſe of the Neck, the lower they are the redder, and thoſe ſeated higher are paler, notwithſtanding they approach neater to the Colour of the *Maxillaries* as they are ſituated nearer to them.

them. In a Horſe, as well as ſeveral other Animals, they are whiter.

Of the Parotid Glands.

THE third Kind of Glands of the Neck are call'd the *Parotids*. Theſe are ſeated about the Root of the Auricle, where they poſſeſs a certain hollow Space made from the Protuberances of the Mamillary Proceſs of the Jugular Bone, and the hindermoſt Proceſs of the lower *Maxilla*. It takes in the whole Circumference of the Auricle, but is much thicker and broader in the lower Part than the upper; for preſently as it aſcends, it grows thinner, but in the lower Part ſtretches out to the Maxillary Glands, which it even touches. This Gland is much larger in a Horſe than in other Animals, and Dr. *Wharton* ſays, he has cut out one that weigh'd eleven Ounces, which was not exceeding Nature, or tumefy'd beyond its uſual Bulk. The Subſtance is not much unlike that of the Maxillaries, tho' a little harder, and more viſcid.

Anatomiſts have aſſign'd three Uſes to theſe Glands, namely, to aſſiſt the Diviſion of the Veſſels, to purge off the Excrements of the Brain, and to moiſten the neighbouring Parts. As to the firſt, that it aſſiſts the Veſſels, this is of ſmall Moment, ſince neither the larger Branches of the Arteries or Veins are convey'd thither by theſe Glands. And as to the ſecond, that theſe Glands are Emunctories of the Brain, and receive the Excrements thereof, this would be of conſiderable Importance, if they could ſhow by what Veſſels or Paſſages the Humidity or moiſt Juices flow'd or diſtill'd from the Head, as is apparent they do in Catarrhs, and the like, in which Caſes they are brought to the Noſtrils or Palate; and one can ſcarce believe that theſe Humours, which have ſuch open and plain Paſſages for their *Exit*, ſhould be brought to the *Parotids* by obſcure and almoſt inacceſſible Ways. Since therefore the Excrements of the Brain do not come by theſe Glands, I cannot ſee how they can purge them off, when there is an eaſier and opener Paſſage for them another Way. The third Uſe aſſign'd, is to moiſten the neighbouring Parts, which is no other than what is appropriated to the Glands of the whole Body: But if Authors would h theſe Glands to moiſten the Parts, by po ing upon them through ſome proper V ſel a peculiar Humour, it is proper that Veſſel ſhould be ſhown, the Kind of H mour, and the Manner how the Part ceives the Humour, and conveys it forwa Some aſſert, that the Exſudation from Ear, call'd the *Ear-Wax*, collected in Paſſage, and ſpued from thence, contribu towards the Hearing; but Dr. *Wharton* i Opinion that thoſe *Sordes* do not appear t be made for that End, becauſe the Secret of all the Glands are rather ſweet, at le inſipid; but theſe Exſudations appear to Excrements of the Cartilages, that are bit ter and inflamable, like the Marrow of Bones; and therefore concludes, that true Uſes of thoſe Glands are, 1. To recei ſome Superfluities of the hard Branch of fifth Pair of Nerves, and convey them int the Veins; 2. To comfort and refreſh Ear and Auricle by their Heat; 3. To fil up and make even the Hollowneſs in Circuit of the Ear.

Behind and about the *Auricles* theſe *Parotid Glands* are ſituated, two of which being more conſiderable than the reſt for their Magnitude, are generally underſtood by that Name. According to *Valſalva* theſe are conglomerate, and by divers excretory Veſſels, which at laſt coaleſce into one Trunk, diſcharge their Liquor into the Mouth at the Inſide of the Cheek by the ſecond Grinding Tooth. Near theſe are two other conglobate Glands, which being leſs, are in a Manner obſcur'd by them. The Bottom of the *Concha*, or Hollow of the Auricle, which is call'd by ſome *Alvearium*, terminates at the *Meatus Auditorius*, which is the Entrance of the Ear ſtrictly ſo call'd.

The exterior Part of this *Meatus* is cartilaginous, though not ſo in all Parts, eſpecially the upper. This Cartilage is irregularly divided with fleſhy membranous Interpoſitions in ſeveral Parts of it, not unlike the *Bronchia* in the Lungs, only its fleſhy Fibres are here thicker. The inner Part, or that which is neareſt the Brain, is bony. It is lin'd throughout with a thin Membrane deriv'd from the Skin, which is continu'd on the *Membrana Tympani*, where it becomes thinner. From the Beginning of the

the *Meatus* near half Way, ariſe a great Number of ſmall Hairs, at whoſe Roots iſſues the *Ear-Wax*, which is entangled in thoſe Hairs, the better to infringe the *Impetus* of the external Air, and prevent its too ſuddenly ruſhing in on the *Membrana Tympani*. Under this is a reticular Body, in whoſe *Areæ* are plac'd the Glands that ſeparate the *Ear-Wax*. Theſe Glands are round, and ſomewhat flattiſh, and of oval Figures, and have a brighter yellow Colour than the Wax they ſeparate. Their excretory Ducts diſcharge themſelves at the Roots of the Hairs above-mention'd. The Uſe of the *Cerumen* or Ear-Wax, is not only to defend the *Meatus* and *Membrana Tympani* from external Injuries, whether from the outward Air, or other extraneous Bodies; but it prevents any violent *Impetus* in Sounds on the *Membrana Tympani*, the Courſe of this *Meatus* winding and turning ſometimes upwards, and ſometimes downwards, but always bending towards the Face.

Of the Maxillary and Almond Glands.

THE inner Part of the Mouth, that is the Inſide of the Cheeks and Lips, the Gums and Palate are all lin'd with a glandulous Coat, which is continu'd over the whole inner Surface of the Mouth, and all its Parts, the Teeth excepted. From the Glands of this Coat, through innumerable little excretory Ducts, is ſeparated a Kind of Salival Juice, which ſerves to keep the Mouth, and all its Parts, moiſt, ſmooth and ſlippery.

Under the Membrane of the Palate are a great Number of pretty conſpicuous Glands ſcatter'd in the fore Part of it, like Grains of Millet, with many Interſtices, whoſe excretory Ducts piercing the Membrane, open into the Mouth; but towards the hinder Part they lie much thicker, and about the Root of the *Uvula* are gather'd and heap'd ſo cloſe to one another, that they ſeem to form one pretty large conglomerate Gland, which is therefore call'd by *Verheyen Glandula conglomerata Palatina*.

Beſides which, there are about the Mouth the *Parotides*, which have been already deſcrib'd. Theſe, though ſituated behind and below the Ears, yet have their excretory Ducts, which run through the *Buccinatores* to the upper Jaw, and there diſcharge themſelves into the Mouth. The *Glandula Maxillaris* is a conſiderable Gland, and of the conglomerate Sort. It is ſituate on the Inſide, under the lower Jaw Bone, near the *Muſculus Digaſticus*. It diſcharges it ſelf by ſeveral Branches of Ducts, which form one Trunk, that paſſes under the *Muſculus Mylohyoidæus*, and meets with that of the other Side within the fore Teeth of the lower Jaw, having diſtinct Orifices, with a *Papilla* on each Side the *Frænum* or Bridle of the Tongue. The *Sublinguales* are ſtill leſs conſiderable than theſe, but of the conglomerate Kind likewiſe, and lie underneath the Tongue on each Side. Their excretory Ducts are but ſmall, and running Parallel with the *Maxillares*, approach each other, and open at ſeveral Apertures in the ſame *Papillæ*, which are ſcarce diſcoverable unleſs the Glands are preſs'd.

The *Tonſillæ*, vulgarly call'd the *Almonds* of the Ear, are ſituated at the Entrance of the *Fauces*, on each Side the *Uvula*, a little below it. They are pretty large conglomerate Glands, having each of them a conſiderable *Sinus*, which receives a mucous Matter from divers leſſer ones, and diſcharges it into the *Fauces* to moiſten and lubricate them, and perhaps to facilitate Deglutition, becauſe whenever the Muſcles of the *Oeſophagus* act, they compreſs theſe Glands, and force out a Part of their Contents.

From theſe Salival Organs ſprings all that Liquor we call the *Spittle*, which flows into the Mouth by the reſpective Ducts, after its Separation from the Blood in the Bodies of the Glands. As the Demand of *Spittle* is greater in Actions of the lower Jaw, that is, in Maſtication, Deglutition, much Talking, *&c.* ſo the Diſpoſition of theſe Salival Ducts, to favour the Diſcharge on thoſe Occaſions, is very remarkable. Thus the Ducts of the Parotid Glands paſs cloſe over the *Muſculi Maſſetores*, and thro' the *Buccinatores*. The Salival Ducts of the *Glandulæ Maxillares* paſs cloſe under the *Muſculus Mylohyoidæus*, where the Sublingual Glands are plac'd. By this Means the Intumeſcence of the *Muſculi Maſſetores* in chewing accelerate the *Spittle* in the *Parotid* Salival Ducts, as the *Muſculus Mylohyoidæus* does in the

Action of Deglutition in drawing the *Os Hyoides* upwards. The Agitation of the Cheeks and Lips is ſufficient to promote the Diſcharge from the *Glandulæ Labiales* and *Buccarum*, mention'd by the Name of the Glandulous Coat.

The external Maxillary Glands are very ſmall, and of leſs Moment. They are ſeated outwardly, almoſt in the middle Length of the inferior *Maxilla*, where the exterior Branch of the Carotid Artery, the external Jugular Vein, and the conſpicuous one of the Nerve of the Third, aſcend to the Muſcles of the Face. The internal Maxillary Glands are ſeated directly betwixt the lower *Maxilla*. The back Part of them, where they join to the Parotid and Jugular Glands, is much thicker and rounder, as well as redder. This Gland has Arteries, Veins and Nerves, beſides a certain Veſſel of a different Kind, peculiar to it. The Arteries proceed from the Carotids, the Veins from the Jugulars, the Nerves principally from the third Pair, having plain Inoſculations with the fourth and ſeventh Pair.

The Veſſel proper to this Part was unknown to Anatomiſts before Dr. *Wharton*'s Diſcovery, but may now be ſeen taking its Riſe from the hind Part of the internal Maxillary Gland, turning directly towards the Chin: But before it comes to the fore Part of the ſame, it receives new Branches, and thence extends them to the middle Space of the Chin, where it immediately terminates in a certain Nipple betwixt both Jaws, whereby it eaſily diſcharges, but admits of no Return from the Mouth. Theſe Glands are in a great Meaſure cover'd with Fat and certain Muſcles, ſo that at firſt Sight they appear much leſs than they really are, notwithſtanding the Muſcles are remov'd. Their Subſtance is like the *Thymus* of a Calf, or the *Pancreas* of a Man.

This peculiar Veſſel diſtributes its capillary Roots equally into all the Parts of this Gland, and in ſome a double Branch, and in others it ſends ſeveral Sprigs. When there is a double one, one is produced from the Head of the Gland, and the other from the Tail. The anterior Branch is brought forward from its Riſe towards a certain leſſer Gland, ſituated in the intimate Part of the *Maxillæ* and the greater Gland. The poſterior Branch iſſues from the Gland abo the Diſtance of three or four Fingers, bef it is join'd with the *anterior Tail*.

Theſe Glands, and the Uſe of them, ſe plainly to be deſign'd as excretory Parts, a aptly form'd for peculiar Services; theref we ought to enquire what peculiar Humo is ſecern'd and excern'd, from whence i deriv'd, and what its Uſe is after Excreti It is certain this Humour is *Saliva* or Spittl but I would not underſtand by that ſuch groſs or thick viſcid Humour as is pre from the *Tonſillæ* by hawking or coughi that we call *Sputum*, but that thin Flu which runs from the Mouth in the Natu of Water, which ocular Experience aſſur us is ſpued out of this Gland into t Mouth; therefore ſince this Veſſel or Duc wanted a Name, it was call'd the *Salivar Duct*. In the next Place it is neceſſary t ſhow, from what Parts, and by what Way this Humour is deriv'd into the Salivar Glands. Dr. *Wharton* is of Opinion, th the *Saliva* proceeds from the *Genus nervoſu* becauſe (ſays he) the Nerve of the ſixth Pai the greateſt Part of which is diffeminate through the Stomach, takes its Riſe but ſmall Diſtance from the Nerves inſerted into theſe Glands, from whence the Maxill ry Nerves by Conſent, from an inordina Motion of the ſixth Pair, are excited to th like Motion, and expreſs a great deal o Moiſture into the Maxillary Glands; ſo th ſame Conſent of Parts being promoted fro that Part, whereby the interior Tunicle o the Stomach is continu'd ſo as to ſpre over the Cavity of the Jaws and the Palat hence the Throat being irritated, irritates th Stomach, and on the contrary the Stoma being irritated, at one and the ſame Ti vellicates the Fibres of the Tunicle of t Mouth, as may be ſeen in Vomiting, fro whence a copious *Saliva* flows from th Mouth, notwithſtanding that Membra betwixt the Tongue and the *Maxilla* h cloſe to the Maxillary Gland, and therefo is only mov'd from the Touch, which pro motes the Excretion. The Proof of this further ſhown from maſticatory and acr Things of all Kinds, which, by being on held in the Mouth, raiſe a plentiful D charge by Spittle.

Beſide

Beſides, to back this Opinion of the ſaid Author, in great Salivations, ſuch as are procur'd by Mercury, the Nerves are much dry'd, and freed from a ſuperfluous Moiſture, which would ſcarcely happen, if the Nerves contributed nothing to the *Ptialiſmus*: Beſides, we can ſcarce aſſign to what other End ſuch a Plenty of Nerves ſhould be brought into theſe Glands. They certainly contribute not much to Motion or Senſe, becauſe they are plac'd too far diſtant from ſenſible Objects: Therefore the Queſtion is, Whether they bring any Thing to the Parts, or carry any Thing off? That they bring, and do not carry away, is evident from hence, becauſe they are excretory Glands. And laſtly, a greater Quantity of *Saliva* is excreted by theſe Glands than can eaſily be believ'd is brought to them by the little Veins and Arteries diſtributed to theſe Parts.

In the next Place we ſhall ſhow the Uſe of this *Saliva* that is ſeparated into the Mouth: And that which gives Occaſion to this Diſquiſition is, becauſe the *Saliva* appears to be a Sort of Excrement; notwithſtanding which, it is neither an unuſeful or unworthy Juice that is thus depoſited in the very Mouth: For firſt of all, as a peculiar *Lympha*, it is required as uſeful to the chewing of Solids, eſpecially dry Victuals; for without it ſuch Animals as live upon Hay, Oats, and other dry Meats, would ſcarce be able either to eat or ſwallow them. In the ſecond Place, the ſame Humour is requiſite to taſte, otherwiſe from acrid Bodies we could never obtain any Diſtinction of the Tinctures they yield, without throwing on of ſome Liquid to extract the Salts that give the Taſte. Thirdly, the ſame Thing contributes to the Promotion of Diſtion, becauſe it procures a Ferment in the Stomach. And laſtly, it quenches the perpetual Trouble Thirſt would create, lubricates the Motion of the Tongue, and tempers or allays the Heat and Roughneſs of the Tongue.

To theſe Glands ſucceed thoſe of the Jaws, commonly call'd the Almonds of the Ears, or the *Tonſillæ*. Theſe Glands, though believ'd to be two, are but really one continued, though they appear to be divided. They are of a ſimilar Subſtance, as it were candied like Honey, or Oil concreted with Cold; likewiſe of a yellowiſh Colour, ſoft to the Touch, yet will harden with boiling. Four Sorts of Veſſels ſupply theſe Parts, Arteries, Veins, Nerves, and proper Ducts or *Sinus's*. The Arteries and Veins proceed from the Jugulars, Nerves from the third and fourth Pair, and ſometimes by Accident from the ſeventh Pair.

They have each one common large oval *Sinus*, that opens into the Mouth, betwixt whoſe Skirts ariſe two larger, and ſeveral leſſer Apertures, diſperſing themſelves alſo the ſame Way through the whole glandulous Root of the Tongue by almoſt an innumerable Company of Protuberances like Nipples, each of which has a little *Sinus* perforate with a middle Orifice. From all theſe *Foramina* ſo diſpos'd by the Root of the Tongue a *Mucus* is expreſs'd. *Fallopius* obſerv'd the Aperture of this *Sinus* in a Man to be like a very ſmall Ulcer when the Gland is ſwell'd, and ſometimes have been treated as ſuch by unskilful Practitioners. Theſe Glands have ſeveral Uſes aſſign'd them, which we ſhall take Notice of by and by from *Malpighius*, *Nuck*, &c.

Of the Glands of the Head.

ACcording to the Method propos'd, we ſhall proceed next to thoſe Glands that are found in the Head, as the *Glandula Pinealis*, the *Plexus Choroides*, *Glandula Pituitaria*, and the *Caruncuiæ Lacrymales*. On the hinder Part of the third Ventricle or Cavity, is a ſmall *Foramen* or Hole leading to the fourth Ventricle in the *Cerebellum*, at the Mouth or Orifice of which is ſeated a ſmall Gland, which, from its fancy'd Reſemblance to a Pine Apple, has been call'd *Conarium*, or *Glandula Pinealis*, which *des Cartes*, and ſome of his Followers, have extravagantly enough imagin'd to be the Seat of the Soul.

Its Subſtance is the ſame as that of the Brain, of a pale Colour, and is cover'd with a thin Membrane. It has three Sorts of Veſſels, an Artery, a Vein, and Nerves. The Nerves are two, each of which take their Riſe from the very Beginning of the *Medulla ſpinalis*, to wit, from the *Crura*, where they are continu'd to the *Cerebrum*. Theſe are very ſhort Nerves, and are only

distributed to this Gland; neither do they rise out of the hairy Scalp. *Sylvius* calls them *nerveos Funiculos.* Anatomists have differ'd much about the Use of this Part, and run very wide of the Mark; for *Riolan* will have it to be as a Sort of Valve to shut and open to the fourth Ventricle of the Brain. *Carteſius*, and many others, make it the Seat of the Rational Soul, whose Opinions *Bartholin* strongly opposes; but *Wharton* rejecting all that went before him, says, that all the Glands seem to have a certain Correspondence with the Nerves, so that the Nerves bring something to them, or else carry something away; for which End this Gland has two Nerves, which he fancies draw certain excrementitious Humidities of a peculiar Nature from the two superior *Crura* of the Beginning of the spinal Marrow, which are here render'd finer, and elaborated into a Substance qualified for nobler Actions; for those two *Crura*, the superior and inferior, are seated at the very Concourse of all the Nerves that arise within the Skull, and by reason of its Continuity with the spinal Marrow, from which all the other Nerves derive their Origines, they may be said to be as their Centre; therefore it is probable, that they either convey off some excrementitious Moisture from the said Nerves, or else supply them with some proper Juices.

On either Side of the Protuberances of the *Thalami Nervorum Opticorum* is to be seen the *Plexus Choroides*, or a small *Plexus* of Blood Vessels, consisting of a great many minute Ramifications of the Veins and Arteries, with small Glands interspers'd, among which some pretend to find *Lymphaticks*, the Existence of which is much easier from Reason be imagin'd, than to be demonstrated to Sight. This *Plexus* is compos'd of three Sorts of Parts, a Membrane, with Vessels and Glands. The Membrane is fine, and seems to be form'd that it may preserve the Vessels and Glands in their Situation. The Vessels are only *Veins* and *Arteries*. *Riolan* only admits of Veins, *Fallopius* only Arteries; but they seem rather to be made up of both: Therefore this *Plexus* has both Arteries and Veins, and the Arteries have a threefold Origine: 1. By the anterior Branches of the soporal Artery; 2. From the Pro gation of the Arteries deriv'd upon Part; 3. By the Classis of those Arte which, from a slender Membrane thro the Substance of the Brain, lead to var Parts of the same *Plexus*.

At the Bottom of the Cavity call'd third Ventricle of the Brain, just below Coalition of the Optick Nerves, lies the *fundibulum*, which seems to be nothing but a Passage continued from the third V tricle to the *Glandula Pituitaria*, between medullary Parts of the Brain, and li with the *Pia Mater*, and therefore not properly to be look'd upon as a Vessel, as an Outlet for Serosities, though this G *dula Pituitaria* seems no proper Drain them, however it may have obtain'd therto.

Underneath the *Infundibulum*, in that *nus* of the Skull which is call'd *Sella Eq* or *Turcica*, upon the *Os Cribrosum*, is situ the *Glandula Pituitaria*, so call'd from suppos'd Office of receiving and discharg the serous Humours evacuated by the V tricles of the Brain: But though the U of this Part, as of divers others about Brain, does not plainly and distinctly a pear to me, yet I cannot admit of this U says Dr. *Drake*, both because it is agai the Office of a Gland to receive Humou already secreted, which a Vessel of a sim Structure might more readily and eas perform, and because it is the peculiar O fice of Glands to separate Humours bef unsecreted, which two Uses imply a dir Repugnance not to be reconcil'd. But b sides, the Structure of this Gland, which firmer than any other of the Body, makes absurd to think, that it should, like a *Spon* suck up Humours, not only in Contra tion to its own Use as a *Gland*, but likew in Violence to its own Structure, which more compact than that of other Glan especially of those of the Brain. I do the fore imagine, that it does, as other Glan serve to secrete some Humour or other, t to what Purpose is not so apparent. Th Gland is very small in humane Bodies, b in Brutes much longer, which Differe may at some Time or other suggest to Man of happy Sagacity something co cern

ning the true Uſe of it. It is cover'd th two Coats from the *Meninges* of the ain.

Of the Glands of the Eyes.

T the Commiſſure or Joining of the Eye-lids, are form'd two Angles or rners, of which the inner, that next the oſe, is call'd *Canthus major*, the other *mi-*; in the former of which lies a ſmall and of an oblong Figure, which is call'd *ndula* or *Caruncula lachrymalis*, though per-ps improperly. From this Gland proceed o or three ſmall Ducts, which opening on the inner Surface of the Eye-lid, ſerve moiſten the Globe of the Eye, and keep Membranes from growing too dry. In is Corner of the Eye are two ſmall Perfo-tions, which are call'd *Puncta lachrymalia*, at open and diſcharge the ſuperfluous oiſture of the Eyes into the Noſe through large excretory Tube.

On the upper Part of the Ball of the Eye, ar the leſſer or external *Canthus*, lies a rge Gland call'd *Innominata*, which con-ſts of ſeveral ſmall Lobes, each of which nd out a Duct, by ſome Branches of which e Eye is irrigated, and the Overplus of e Humour carried to the greater *Canthus*, nd tranſmitted to the Noſe through the *ncta lachrymalia*. From theſe Glands pro-eeds that Humour which forms the Tears.

The Learned *Nuck*, that inquiſitive Ana-omiſt, pretends to have diſcover'd ſome Ducts which convey the aqueous Humour f the Eye to the Inſide of the *Cornea*, which Diſcovery has however been conteſted. The uthor is notwithſtanding ſo ingenuous as o own, that by whatever Inquiries or Ex-eriments he could make, in which he was ſually very happy, he could never trace theſe Ducts to their Source. Some who will ot allow theſe Ducts, would have this Humour to be deliver'd immediately from he Arteries, becauſe they cannot find from whence it ſhould come, which is an Opi-ion contrary to the Method of Nature in ther Separations. But if a Conjecture may e allow'd in this Caſe, believing *Nuck*'s Diſcovery to be real, it is not improbable hat theſe aqueous Ducts are only Branches f the excretory Ducts of the *Glandula inno-minata* and *lachrymalis*, which piercing the *Tunicks* of the Eye, deliver their Liquor by Ways hitherto undiſcover'd. This only is certain, that they muſt have ſome conſide-rable Source, becauſe if by any Accident the *Tunick* of the Eye be wounded, and the Humour runs out, as it really will, by meer cloſing of the Eye, the Wound is ſoon heal'd, and the Humour recruited, which cannot naturally be expected from the Arte-ries without ſome intermediate Organ of Separation, which Organ has not yet been elſewhere diſcover'd.

Of the Axillary Glands, and thoſe of the Groin.

THAT which comes next under our Conſideration, are the Glands under the Arm-pits, and thoſe of the Groin, and alſo thoſe which are near the Tendon of the *Muſculus biceps* in the Bending of the Elbow, and thoſe which are under the *Poplitæus* in the Bending of the Knees; thoſe likewiſe about the mid Thigh, along the *Muſculus ſartorius*; to which we ſhall ſub-join the concatenate Glands, or thoſe which hang as it were in Chains from the Ears to the Clavicles, that theſe may be number'd among the morbid Glands, as being fre-quently præternatural both in Reſpect of Number and Size.

Firſt, there are ſeveral of theſe Glands that receive different Names from their Si-tuation, Properties, and the like. Thoſe in the Groin are call'd *Bubo's*: Thoſe in the Middle of the Thigh are amongſt us call'd the *Nut* or *Pope's Eye*, eſpecially in Sheep or Oxen: Thoſe under the Arms the *Axil-laries*. The reſt are nam'd according to the Places of their Situation.

Secondly, theſe Glands have no Difference as to Bulk and Number. Thoſe in the Groin, though they are eight, are large: Thoſe in the Privy Parts are found moſt commonly to be leſs: Thoſe towards the Bending of the Knee, and in the Thigh, ſtill leſs: And laſtly, thoſe plac'd at the Bending of the Elbow, a little above the Tendon of the *Muſculus biceps*, the leaſt of all. But it ought to be obſerv'd, when we mention theGlands in the Groin to be lar-

ger

ger than thoſe of the Privities, we mean the greateſt of one Sort with the other, and not the greateſt of one Sort compar'd with the leaſt of the other.

In the third, there is Difference as to their Shape or Figure, for ſome are round, and others oval; but why they are conſtant in ſome Places, and rarely or ſeldom found in others, is not eaſy to aſſign. *Riolan* from *Hippocrates* will have it, that the Glands and Hair were appointed for the ſame Uſes: *For Nature*, ſays he, *made the Glands and Hair to the ſame Purpoſes, for what flows from the one is receiv'd by the other, which is its Increaſe and Nouriſhment.* We confeſs, ſays Dr. *Wharton*, that both Hair and Glands are found in the Groin and Privy Parts; but yet in the Bending both of the Knee and Elbow, where there are Glands, there are no Hairs. Beſides, there are other Parts of the Body where there are no Glands, and yet are ſupply'd with Hair, as the Breaſt, Thighs, Legs, *&c.* from whence it is certain, that the Glands and Hair ought not to be join'd together out of that Neceſſity of Nature as *Riolan* pretends, but that Hair may grow where there are no ſuch Glands, and on the contrary there may be Glands where there is no Hair.

Wherefore Dr. *Wharton* has given another Reaſon for the Uſe of theſe Glands, having firſt laid down that there is Communication betwixt the Glands and Nerves, and therefore that the Nerves either convey ſomething to them, or carry ſomething off from them, or perhaps do both at different Times; for it is probable the Nerves bring ſomething to them that is uſeleſs and excrementitious in reſpect of the *Genus nervoſum*, but not ſo in reſpect of the Veins. Beſides, theſe Glands do not exonerate or diſcharge themſelves into the excretory Ducts, but the next adjacent Veins, which is the Reaſon why they are plac'd at the larger Diviſions of the Veſſels, to wit, that they might receive the Superfluities of the Nerves more readily into the Veins, with which they are firmly united.

Beſides all theſe Glands before ſpoken of, there are mucilaginous Glands mention'd by Dr. *Havers*, of which there are ſome in every Articulation: But thoſe at the Articulations *per Enarthroſin* are conſiderable for their Magnitude, and lie at the Bottom of concave Part of the *Acetabulum*. They of the conglomerate Kind, and as tho the Muſcles, afford a Mucilage, which ing with the Oil iſſuing from the Cav of the Bones through the Perforations be mention'd, ſerves to lubricate and re the Cartilages more ſlippery and eaſy Motion, as well as to keep them ſoft.

Of the Glands of the Parts of Generation in Men; and firſt of all the Teſticles.

HAving examin'd the Glands which long to the Individual, as to the *Ge* we ſhall now come to thoſe which relate the Continuation of the Species, ſome wh of are peculiar to the Males, others to Females. Thoſe belonging to the Males a the *Teſtes*, *Epididymis*, *Paraſtatæ*, *Medulla D ferentium glanduloſa*, *Veſiculæ ſeminales*, *Pro tæ*, *Caro glanduloſa Corporum nervoſorum*, a *Glans Penis*. The Teſticles are ſoft whi Bodies, uſually in Number two, thou ſome have naturally had three, and othe but one. Their Figure is oval, and the Size about the Bigneſs of a ſmall Pullet's o a large Pidgeon's Egg. They have be thought to be of a glandulous Subſtanc and according to the preſent prevailing N tion of the Structure of Glands, they m be allow'd to be ſo ſtill, notwithſtandi the Diſcovery of that inquiſitive Anatom *De Graef*, who finds them to be nothi but a Convolution of Veſſels of diver Kinds, whereof the principal are the Blo Veſſels before deſcrib'd, of which the Art ries bring the Blood, from whence the Se is to be ſeparated, and the Veins return after the Separation made. The reſt of t Teſticle, which is much the greater Part, made up of Seed Veſſels, which are ind but one continued Series or Rope intricat convoluted, and wound up as it were in a Bottom, but adhering ſo laxly, that th are eaſily drawn out into Length, and *Rats* ſhaken from their cloſe Contexture firſt ſeparating the *Tunica Albuginea*, putting the Teſticle into Water, and t agitating it lightly, theſe *ſeminal Tubuli* w be very manifeſtly disjoin'd.

Some

Some have fancied Glands to be neceſſarily
erſpers'd for the Separation of the Seed;
t no Man has been able yet to demon-
ate them, nor does the Neceſſity appear,
we ſuppoſe, as at preſent many do, that
Glands are but a Convolution of the
nguineous and excretory Veſſels, though
other Parts their Texture be not ſo looſe,
r their *excretory Tubules* ſo conſpicuous.
e *Lymphæducts* of theſe Parts are very vi-
le and apparent in larger Animals, eſpe-
ally if you make a Ligature upon the *Vaſa*
eparantia, or inject into them alive, or
t after the Death of the Animal. They
em to ariſe from the Tunicles of the *Teſtes*,
d from thence the Veins joining them by
Proceſs, enter the *Abdomen*, and then pre-
ntly turn towards the Glands of the Me-
ntery, from whence they are carried to the
mmon Receptacle with the Lacteals. We
all defer the Deſcription of the Action
d Uſe of the *Teſtes*, till we have done
ith that of the *Epididymidæ* and *Paraſta-*
æ.

The *ſeminal Tubuli*, before ſpoken of, ter-
inate in the *Paraſtates* or *Epididymidæ*,
hich are tuberous varicoſe Bodies, lying
en, and adhering to the upper Part of the
ſtes, of which they ſeem properly a Part,
ough of a different Form and Conſiſtence;
r though the *Paraſtatæ* be only a various
nvolution of the *ſeminal Tubuli*, mix'd
ith the Blood Veſſels, as the Teſticles them-
ves are, yet here thoſe *Tubuli* being united
to one, the various Convolutions of which
ing more firmly bound together by a ſtrong
embrane ariſing from the *Tunica albuginea*,
e Body of it feels more compact.

The *Teſticles* and *Paraſtates* are ſaid to be
cloſ'd in three proper Membranes. It is
tended the firſt is deriv'd from the *Cre-*
aſter Muſcle, which we take to be a need-
ſs Multiplication of Membranes, all Muſcles
ke this having their proper Membrane,
hich is all that is meant herein. This Cre-
aſter Muſcle preſenting it ſelf, muſt be re-
mov'd before the proper Membrane of this
rt can be ſeen. It ſprings fleſhy from the
ine of the *Os Ilium*, and in its Deſcent ex-
ends it ſelf on the Surface of the *Tunica*
aginalis, to which it firmly adheres.

The *Tunica elytroides* or *vaginalis* is a Con-
nuation of the external *Lamina* of the *Pe-*
ritonæum, and is liable to be divided into ſe-
veral Membranes, which ſome Anatomiſts
pleaſe themſelves with. It incloſes the whole
Teſticle. The third Coat is the *Albuginea*,
ſo call'd from its Colour, which is white.
It is a ſtrong thick Membrane, very ſmooth
on the outward Surface. The inward, which
adhere to the Subſtance of the *Teſticle*, is
rough and uneven. Into the upper Part of
this Membrane are inſerted Blood Veſſels,
Nerves, and *Lymphaticks*, which ſend from
thence diverſe Branches into the Subſtance
of the *Teſticle*.

The *Lymphaticks*, which do not appear in
the common Diſſections, ſhew themſelves
pretty plentifully upon this Membrane, if a
Ligature be laid upon the *Corpus varicoſum*
of a Dog, or any other live Subject. They
go to the common Receptacle of the Chyle.
The common *Capſula* or Membrane wherein
the Teſticles are contained, is the *Scrotum*.
This conſiſts of two Membranes, the exte-
rior, being only a Production of the *Cuticu-*
la or *Cutis*, which is here ſomewhat thinner
than in other Parts, without any Fat under
it. The inner Membrane, which is call'd
Dartos, is only an Expanſion of the *Panni-*
culus carnoſus, which, together with the *Cu-*
tis, is drawn into the Figure of a Purſe ex-
ternally. This Purſe is as it were divided
by a Line which runs longitudinally, and
parts it into the Right and Left Side, and is
call'd the Suture. Anſwering to this in-
wardly, is a Membrane which divides the
Cavity juſt in the ſame Manner, being on-
ly a Production of the *Dartos*, as the *Me-*
diaſtinum is of the *Pleura*. It is like that
diviſible into *Lamellæ*, and the Teſticles are
on each Side looſely connected to it by
Means of their outward proper Coat. It
ſerves to ſuſtain the *Teſtes*, and to defend
them from Colliſion againſt each other, to
prevent their falling down too low, in
which it is auxiliary to the *Cremaſters*, and
to promote the Corrugation or Wrinkling
of the *Scrotum*.

From each Teſticle proceeds a round hol-
low Body, reſembling ſomewhat in exter-
nal Appearance a large Nerve, which is
call'd *Vas deferens* or *ejaculans*. It ariſes from
the Extremity of the *Epididymus*, and is no-
thing elſe but a Production of the *ſeminal*
Tubulus or Channel, which is continued
from

from thence to the *Veſiculæ ſeminales.* It is about the Bigneſs of a ſmall Gooſe Quill, and aſcending along the *Vaſa Præparantia*, it makes ſeveral Serpentine or Worm-like Turnings and Windings before it leaves the Body of the *Teſticle*, where it compoſes that Body call'd the *Epididymis*, and there enters the *Abdomen* with the aforemention'd Veſſels through the Perforations of the tranſverſe and oblique Muſcles. Having enter'd the *Abdomen*, it is reflected towards the Back of the Bladder, and croſſing the *Ureter*, grows larger as it approaches the *Veſiculæ ſeminales*, and then again contracting it ſelf juſt at the *Veſiculæ ſeminales*, the two *Deferents* come together, and ſeem to paſs between them into the *Proſtates*, and through them into the *Urethra*, without communicating till then either with one another, or with the *Veſiculæ ſeminales* or *Proſtates.*

It has been a Controverſy among the Anatomiſts, Whether the *Vaſa deferentia* had any Communication with the *Veſiculæ ſeminales*, or did depoſite into them the Seed which they convey'd from the *Teſticles? Wharton*, *Swammerdam*, *Vanhorn*, and others, have maintain'd the Negative, as others have done the Affirmative, whoſe Reaſons we ſhall have Occaſion to examine hereafter.

The *Veſiculæ ſeminales* are two membranous Bladders, ſituate between the *Veſica urinaria* about the Neck and the *Inteſtinum rectum.* They are ordinarily three or four Fingers Breadth long, and one broad, and about the third Part of an Inch thick, tho' their Dimenſions vary very much in the ſame Subject according as they are full or empty. They conſiſt of divers membranous Cells, which are plainly to be ſeen in a *Veſicula ſeminalis* blown up and dry'd, and afterwards cut. Theſe Cells open one into another, as appears by the ready Communication of the *Flatus.* They are not all of a Size, but ſome are greater, ſome are leſs, and all are form'd out of the ſame fibrous Membrane, through the Contraction of which, by the Influx of the Animal Spirits *in Coitu*, ſome will have the Emiſſion to be occaſion'd, tho' I cannot think the Fibres ſufficient for that Purpoſe.

Theſe *Veſiculæ* appear externally variouſly and unequally contorted and convoluted, reſembling the irregular Figure of the Guts of a ſmall Bird, cover'd with a thin Membrane, upon which creep many Branches Arteries, Veins, Nerves, and *Lymphatics* From each Side they empty themſelves, without communicating with each other, into a ſmall Duct, which about a Finger's Breadth below the Neck of the Bladder is inſerted ſeparately into the hinder Part of the *Urethra.* Dr. *Wharton*'s Ground of imagining a peculiar Sort of Seed to be ſeparated in theſe *Veſiculæ* would have been more ſubſtantial and convincing, if thoſe Glands which he mentions had been conſiderable for their Number or Magnitude; but they are ſo far from being ſufficient for that Office, that they are not conſpicuous, and by moſt other Anatomiſts have been unobſerved. *De Graef*, who ſought for them expreſly, denies their Exiſtence. It ſeems therefore unreaſonable to aſſign that Office to them whilſt their very Exiſtence is controverted. However, it is not improbable that the *Veſiculæ ſeminales* may be furniſh'd with Glands as the *Veſiculæ fellea* and *urinaria* are: but then we cannot aſſign them any other Uſe than thoſe Glands have in their reſpective Parts, that is, to afford a mucous Lining with this Difference, that it is not to protect the Membrane from any Acrimony of the Seed, but to lubricate it, and facilitate the Expreſſion of it, leſt it ſhould otherwiſe adhere to the Inſide of the Membrane, as all viſcous Fluids are apt to do to the Sides of a dry Veſſel.

The *Proſtates* form a ſpongy glandulous Body, ſomewhat flattiſh on its upper Surface, ſituate juſt below the Neck of the *Veſica*, about the Bigneſs of a *Walnut.* Authors have aſcrib'd to it a Subſtance of two Kinds, one glandulous, and the other ſpongy or porous, which latter ſeems in Reality to be nothing elſe but a *Congeries* of very minute Veſſels, and extremely ſmall membranous Cells. In the Middle of thoſe run the excretory Ducts of the *Veſiculæ*, paſſing quite through without any Communication. It has excretory Ducts of its own pretty numerous. *De Graef* does not remember to have obſerv'd them fewer than ten in Men, and in Dogs he has ſeen near a Hundred. Every one of theſe diſcharges it ſelf into the *Urethra*, ſome above, ſome below the *Caput gallinaceum*, but all more laterally than

Veſiculæ ſeminales, having each of them its proper *Caruncle*. Out of theſe iſſues a Sort of glutinous tranſparent Liquor, which ſome would have to be a third Sort of Seed, but in my Opinion ſerves only to lubricate the Paſſage of the *Urethra*, and thereby to prevent any Adheſion of the *true Seed*, which might hinder its being emitted with a ſufficient *Impetus*. The *Proſtates* are externally cover'd with a fibrous Membrane, ſomewhat like that of the *Veſiculæ*, and through it are diſpers'd the ſame Sort of Veſſels, and from the ſame Parts, as Arteries and Veins from the *Hypogaſtricks* and *Meſaraicks*, and Nerves from the *Plexus* of the *Pelvis*.

Of the Glands of the Penis, &c.

THE *Cuticula* of the *Penis* differs not from that of other Parts, unleſs on the *Glans*, where it is very delicate and thin, and appears to have a ſmooth Surface, not rough and ſquamous, as that of other Parts when view'd with Magnifying Glaſſes. The Skin it ſelf is not ſo thick as it is generally found on other Parts. The Doubling of it on the *Glans* makes the *Præputium*. It is tied to the lower Part of the *Glans* by a Ligament call'd the *Frænum* or Bridle. In this alſo Nature varies; for it is often ſo ſhort, that unleſs it be cut, it will not admit of perfect *Erections*.

At the Connexion of the other Part of the internal Skin of the *Prepuce*, are divers oval and roundiſh little Glandules plac'd irregularly, and that not only in the Neck or Joining of the *Glans* to the *Corpora cavernoſa*, but on the *Glans* it ſelf. By theſe *Glandules* is ſeparated that Liquor that renders the Agitation of the *Prepuce* on the *Glans* eaſy. When this Liquor becomes rancid, as it does in old People, and in Venereal Contacts, it excoriates the *Glans* and *Prepuce*, and very often exulcerates, and renders the *Prepuce* liable to contract, and obliges the Patient to have it divided.

The *Lymphæducts* of the *Penis* are very numerous on its Surface under the Skin, in that looſe Membrane that is in the Place of the *Membrana adipoſa*. If you blow into the Veins of a Dog's *Penis*, its *Lymphæducts* will be inflated, after its cavernous Body is extended. Theſe, like the *Lymphæducts* of the lower Parts, diſcharge their *Lympha* into the *Glandulæ inguinales*. Hence perhaps the morbid Matter in Venereal Caſes is tranſfer'd into theſe *Glands*, and cauſes thoſe *Tumours* call'd *Bubo's*, from the *Glands* call'd *Bubones*. On this Account the opening theſe Tumours before the uſual Time for Suppuration in other Tumours appears neceſſary, leſt the peccant Matter be convey'd by the exporting *Lymphæducts* of theſe Glands into the Maſs of Blood, of which we meet with too many Inſtances.

There remain yet to be accounted for, three ſmall *Glands* diſcover'd by Mr. *Cowper*, and not yet taken Notice of by any other Anatomiſt. They all empty themſelves into the *Urethra*, and are by Mr. *Cowper*, from the Tenacity of the Liquor which they ſeparate, call'd the *mucous Glands* of the *Urethra*. The two firſt diſcover'd of theſe are about the Bigneſs of a *French* Bean, of a depreſs'd oval Figure, of a yellowiſh Colour, like the *Proſtates*, and lie on each Side the *Bulb* of the *cavernous Body* of the *Urethra*. A little above it their excretory Ducts ſpring from their internal Surface, next the inner Membrane of the *Urethra*, whence deſcending about half an Inch, they begin to grow leſs, and piercing that Membrane obliquely, open into the *Urethra* by two diſtinct Orifices, juſt below its Bending, under the *Oſſa Pubis* in the *Perinæum*, where they diſcharge a *tranſparent viſcous Liquor*.

Beſides this Pair, there is a third *mucous Gland* diſcover'd likewiſe by the ſame Mr. *Cowper*, to whoſe happy Sagacity, Induſtry, and communicative Temper, the Inquiſitive into this Part of Knowledge are infinitely indebted. This is deſcrib'd by him in the *Appendix* to his Εὐχαριστία, and is a ſmall conglobate yellowiſh Gland like the former, but ſomewhat leſs. It is ſituate about the Angle of Flexure of the *Urethra*, under the *Oſſa Pubis* in the *Perinæum*, near the *Anus*. To find this *Gland*, the *Corpus cavernoſum Urethræ* muſt be divided lengthways to the inner Membrane of the *Urethra*, which muſt be cautiouſly freed from the Body, which done, the Gland will appear in the Place already mention'd. It has two excretory Ducts, which enter the *Urethra* obliquely about a

Quarter of an Inch below the Orifices of the two former, and diſcharge a Liquor like theirs both in Colour and Conſiſtence.

Mr. *Cowper*, ſays Dr. *Drake*, who was always ingenious, and generally right in his Conjectures about Anatomical Matters, thought there might be two Uſes of this *Mucus*. The firſt, to hinder any Remains of Urine from mixing with the *Semen* in the *Urethra Tempore Coitus*, which, ſays he, I can find no Reaſon to expect there at that Time; yet, ſays the ſame Author, I muſt ſubſcribe to his Opinion, *That the main Deſign of Nature in framing theſe Glands, ſeems to reſpect the grand Work of Generation*; for by their Situation they muſt neceſſarily be compreſs'd upon Erection, and conſequently diſcharge their Contents before the *Teſtes* and *Veſiculæ ſeminales*, which are not ſubject to ſo immediate a Force. I apprehend therefore, that their *Mucus* ſerves to lubricate the Pipe of the *Urethra*, and thereby to facilitate the Emiſſion of the *Semen*, and render it more vigorous and projectile than otherwiſe it could probably be, if ſo viſcid a Liquor as the *Semen* were to paſs through a Channel abſolutely dry, to which it would be apt to adhere, and ſo its Projection be obſtructed.

Much leſs can I think, continues he, that they were by Nature contriv'd to defend by the *Mucus* which they afford the *Urethra* from the Acrimony of the urinous Salts; for to anſwer that End, the *Urethra* ſhould be conſtantly lin'd with it, and the Diſcharge continual, as it is in a Gleet, when the *Caruncula*, which cloſes the *excretory Duct* of any of theſe Glands, happens to be eroded, as we obſerv'd it once in a Servant of mine, of which Mr. *Cowper* has given us the Hiſtory and the Figure in his Deſcription of theſe Glands, publiſh'd before his Εὐγαστρία. But as theſe Glands do not emit their Liquor *in Statu ſano*, but upon Compreſſion, which cannot happen but in Erection, and that a pretty ſtiff one too, by reaſon the Reſiſtance of the Caruncle muſt be forc'd, it is not probable that this Liquor ſhould be always diſcharg'd previous to the Urine, which is as often made with a *flaccid Penis* as otherwiſe; nor indeed do I ſee any Need to hunt for any other Uſe than that aſſign'd.

Mr. *Cowper* having, with his Deſcription of the firſt diſcover'd Pair of the Glands hinted his Suſpicion, that an inveterate Gleet might proceed from a *Venereal Ulcer* happening upon the *Oſteolum* of either of theſe whence if an abſolute Eroſion of the *Caruncle* enſued, an incurable Gleet might follow, an Opportunity preſented it ſelf to me to examine into the Certainty of that Opinion, in a Servant who died of a *Peripneumony*, but had been ſome Years troubled with an obſtinate Gleet. In this Subject, we found that the *Caruncle* which ſhould have clos'd the *Duct* of the *mucous Gland* on the Left Side had been eroded by an Ulcer, and the Orifice of that and of the Left Duct of the ſingle *mucous Gland* laid into one. Hence proceeded an almoſt conſtant Dripping of a diaphanous viſcid ropy Liquor, ſuch as theſe Glands furniſh, which is what we call a *Gleet*, and muſt neceſſarily happen to all Perſons under the like Circumſtances. He that conſiders that a *Clap* is nothing but an Ulcer rais'd in the *Urethra* by the Inſinuation of ſome virulent, or to ſpeak more properly, acrimonious purulent Matter into it, will not wonder that it ſhould often hang and fix its Seat at the *Oſtiola* of theſe excretory Ducts. But of this more fully when we come to treat of this Diſeaſe at large.

Of the Glands of the Parts of Generation in Women.

HItherto we have follow'd the Method of Dr. *Wharton* as to the Glands, but we ſhall now treat of theſe Parts according to *De Graef*, as the moſt natural and eaſy; therefore I ſhall begin with the *Labia*. The Skin on each Side of the *Rima* is ſupported and plump'd up with the Fat of the *Membrana adipoſa*, which is here thicker than ordinary, and makes together the *Labia*. Juſt above the *Labia*, between the *Inguina*, is the Space which is call'd the *Pubes*, the middle and moſt prominent Part of which has been nam'd *Mons Veneris*, which is a little Protuberance, occaſion'd by the more than ordinary Collection of Fat under the Skin in that Place. All theſe Parts are cover'd with Hair, as moſt other Parts where the Miliary Glands of

of the Skin are larger than ordinary, and cover'd with Fat, uſually are. Theſe being abſolutely external, are expos'd to View without Deduction, and they, as well as the adjacent, have been call'd by Variety of Names, which ſignify nothing to our preſent Purpoſe.

In the upper Part of the *Pudendum*, juſt within the *Labia*, is the *Clitoris*, a Body ordinarily about the Size of the *Uvula* when it is not relax'd; but ſometimes by extraordinary Means, and in extraordinary Caſes, it will be extended almoſt to the Bigneſs of the *Penis* of a Man, which at all times it reſembles very exactly in its Figure, except that it is not perforated. The *Clitoris* conſiſts of two nervous or ſpongy Bodies, like thoſe of the *Penis*, having their Origine from the lower Part of the *Os Pubis* on each Side, which come together from the Body that is call'd the *Clitoris*; and though it has no Perforation analogous to that of the *Penis*, yet has a *Septum* or membranous Partition, which runs all along between theſe two nervous Bodies from the *Glans* to its Divarication at the *Os Pubis*, where they are call'd *Crura Clitoridis*, and are near three times as long as the ordinary Trunk of the *Clitoris* it ſelf. At the End of it is a *Glans*, reſembling in Proportion that of the *Penis*, except (as has been ſaid) the Perforation. This *Glans* is cover'd with a *Prepuce*, form'd out of the inner Membrane of the *Labia*.

It has Arteries from the *Pudenda*, and its Veins return from the *Hypogaſtricks*. The Nerves come from the Intercoſtals, and run in pretty large Twigs along the Back of it. Hence it is, that it appears ſo extremely affected in the Act of Coition. After the Blood Veſſels and Nerves have parted with Branches to the *Clitoris*, they are partly ſpent in a cavernulous Subſtance, call'd by *De Graef* *Plexus reticularis*, that environs the *Pudendum* immediately under the *Nymphæ*, to which they alſo ſend Branches. All theſe Parts being fill'd with Blood, do more adequately embrace the *Penis in Coitu*; and by their Intumeſcence, they not only force out the Contents of the *Lacunæ*, or excretory Ducts of the *Proſtatæ*, or *Corpus glandulоſum* in the Neck of the Bladder, but by excluding the external Air, the *Semen maſculinum* is injected to the *Fundus Uteri*, and the *Fallopian* Tubes; and that more eſpecially, if we conſider that the *Parietes* of thoſe Parts are furniſh'd with a vaſt Number of Blood Veſſels, eſpecially Veins, and on their Intumeſcence, that the internal Air muſt be rarefied in thoſe Cavities, by which Means the *Semen maſculinum* paſſes to the *Ovaria*.

The *Nymphæ* or *Alæ* are ſoft ſpongy red Bodies, deſcending from the Top of the *Clitoris*, to which they firmly adhere to the Sides of the *Meatus urinarius*, thereby reaching to about the Middle of the Orifice of the *Vagina*, where growing inſenſibly leſs and leſs, they diſappear; ſo that their Length may be accounted from the *Clitoris* to the Middle of the Orifice of the *Vagina*. Their Breadth is very uncertain, but in Maids uſually about that of half a Finger. They are ſometimes found much larger, and are capable of being diſtended to a great Degree, ſo as to hang a good Way out of the Body, and in ſome, theſe, as well as the *Clitoris*, have been forc'd to be cut. The Uſe of them is by ſwelling in the Act of Coition to embrace the *Penis*, and by their Senſibility to affect the Woman, and mutually to invite to Procreation. They have their Blood Veſſels and Nerves in common with the *Clitoris*.

Juſt above the Orifice of the *Vagina* is the Orifice of the *Urethra*, opening with a little Intumeſcence. It is externally cover'd with a whitiſh Subſtance, which is partly glandulous, and partly membranous, out of which iſſues a glutinous limpid Matter thro' certain Ducts, which comes from the inward Part of the *Meatus*, and ſerves to anoint the Extremity of the *Urethra*.

Adjoining, or rather in the Place of the *Hymen* in Adults, in whom it is not found, are four little *Caruncles* or fleſhy Knots about the Bigneſs of Myrtle Berries, which ſome ſuppoſe to be largeſt in Maids, and by Degrees to grow leſs through the Uſe of Venery: Others with more Probability derive them from the broken Membrane of the *Hymen*, whoſe Fragments ſhrunk up they take them to be. Which of theſe is in the Right, we ſhall not here determine.

Near the Ends of the *Tubæ Fallopianæ*, about two Fingers Diſtance from the *Uterus*, lie the *Ovaries*, or *Teſtes muliebres*, ſo call'd from their Uſe, which was formerly ſup-

pos'd to be analogous to that of the *Teſticles* in Men. They are connected to the Womb by a ſtrong Ligament, call'd by many Anatomiſts *Vas deferens*, upon Suppoſition that it was a Veſſel which convey'd the Seed to the Womb, and in ſome Meaſure likewiſe by the *Tubæ Fallopianæ*, and by the broad Ligament. About the Region of the *Os Ilium*, they are faſten'd to the *Peritonæum* by Means of the ſpermatick Veſſels, and the Membranes which cover them, by all which the *Ovaries* are kept ſuſpended about the ſame Height with the *Fundus Uteri* in Women not pregnant. In Pregnants, they riſe along with the *Uterus*, but not quite ſo high as that does in the laſt Months of Geſtation.

Their Figure is not ſo round as the *Male Teſtes*, but is a Kind of Semi-oval, gibbous on one Side, and depreſs'd on the other, with a Superficies ſomething uneven, through the unequal Protuberance of the *Ova* which they contain. They are of different Magnitudes in the different Stages of Life. At the Time of *Puberty*, when they are at their largeſt, they weigh ordinarily about a Dram and a half, and are about half the Bigneſs of a Man's Teſticle. In the Flower of Age, they are plump and ſucculent; but as Age comes on, they wither and ſhrink by Degrees, and grow hard and dry, ſo as ſometimes at laſt to weigh not above a Scruple. Some Anatomiſts have affirm'd, that theſe, as glandulous Parts, like the *Thymus*, were bigger in Infants, and decreaſe gradually after Birth; but *De Graef*, who weigh'd many of thoſe of new born Children, ſays, he never found them weigh more than between five and ten Grains.

They are cover'd externally with a common Membrane from the *Peritonæum*, to which ſome add a proper Membrane. The Membrane being taken away, the Subſtance appears whitiſh, compos'd of a Multitude of thin little Membranes and ſlender Fibres, interwoven with a great Number of Arteries, Veins and Nerves. Among theſe Fibres, Membranes and Veſſels, are found interſpers'd a Number of little round Bodies, like Bladders, full of a limpid Subſtance, like the White of an Egg, which boil'd, acquire the ſame Colour, Taſte, and Conſiſtence, with the boil'd White of an Egg, from which Similitude, as well as from the Analogy of their Uſe, being taken for the material Principle of Generation, they are now call'd *Ova* or Eggs, and the *Teſtes* in which they are contain'd, *Ovaries*.

Theſe Eggs are of very different Magnitudes in the ſame *Ovary*, though the biggeſt in a Woman ſeldom equals the Size of a white Pea. They are ſo numerous, that *De Graef* has told above twenty in an *Ovary*. Theſe Eggs have been found by Anatomiſts in the *Ovaries* of almoſt all Sorts of Animals, and are doubted to exiſt in the Females of all Animals whatſoever. *Nuck* has given us an accurate Deſcription of the Lymphæducts of the *Ovaria* in his *Adenographia curioſa*, and *Utero Fœminei Anatome nova*. They ariſe from the Surface of the *Ovaria* by ſeveral Branches, which unite, and make three Branches on each Side, and partly empty themſelves into the Lymphatick Glands below the Emulgent Veſſels, whence other exporting Lymphæducts ariſe, and empty themſelves into the *Receptaculum Chyli*: Others empty themſelves immediately into the *Receptaculum*.

Of the Glands of the Breaſt, Adventitious Glands, &c.

BReaſts, Dugs or Teats, are proper to moſt Animals. They are ſeated in Women upon the Pectoral Muſcles in the Middle of the Breaſt, but in other Animals under the Belly, and betwixt the Thighs: But the Ape, and Sylvan Man, call'd *Orang Outang*, which is the only Creature beſides Man that carries its Young in its Arms, have their Dugs upon the Breaſt. Some ſay, the Elephant, *&c.* have the ſame. The Reaſon of the Situation of theſe Parts in Women is Beauty, and Conveniency of giving Milk or Suckling; for the Child new born not being able to walk like Brutes, muſt be held in the Arms of the Mother and put to the Breaſt.

The Figure or Shape of the Breaſt is half ſpherical, of a ſoft Subſtance, the largeſt, firmeſt, and whiteſt of all the Glands, namely, in Women; for in Cows it is yellower, conſiſting of a glandulous *Parenchyma*, ſpongy, continued, regularly riſing towards

wards the Nipple, not being divided into ifferent Globules except in a præternatural ate; but in ſcirrhous and cancerous Tuours they become knotty. The *Parenchyt*, ſays Dr. *Wharton*, is ſpongy, and perious from one Part to another, and all the res, which are very conſpicuous, and call'd e Milk Veſſels, end in one common Duct the Nipple. This Part has Arteries, Veins, erves, Lymphæducts, and a porous Cavi. The Arteries are from the *Subclavians*, e Nerves from the fifth Pair of the Spine, d there are Abundance of *Lymphæducts*, hich are very viſible and plain in the Dugs Cows, as well as the Milk Veſſels or poous Cavity of theſe Glands. The Uſe of heſe are to ſecrete Milk for the Nouriſhent of the Infant; but whether this Milk s ſeparated from the Blood or the Chyle, s an Argument more proper to be handled n another Place: However, *Wharton* allows heſe glandulous Bodies to ſecrete other Juices as well as that of Milk.

As we have, after *Wharton*, divided the Glands into Natural or Perpetual, and Contingent or Adventitious, the Natural we have already gone through with, and the Adventitious we ſhall now proſecute, and divide into thoſe that are form'd, and ſuch as are rude or imperfect, whereof all Glands partake before they receive their utmoſt Perfection, the Rudiments of ſuch Glands being compar'd to form'd or perfect Glands, as Eggs are to Chickens, for whatſoever is in the Chicken was in the Egg. The form'd Glands are divided into ſound and diſeas'd. The ſound Glands, though Adventitious, do not vary abundantly from the Natural, only that they happen in uncommon Places; notwithſtanding which, I grant they may be call'd diſeas'd as to the Parts, but otherwiſe they are ſound in their own Nature.

Of this Kind of ſound Glands, Dr. *Wharton* ſays he ſaw Abundance in a certain Knight, who was then lodg'd in the *Savoy* for a Cure, in whoſe Arms and Thighs there were Abundance growing, both ſimple and cluſter'd, that were fix'd under the Skin, either in the *Panniculus carnoſus*, or adipous Skin: But they were all moveable and inſenſible, though preſs'd or ſqueez'd. A very expert Surgeon propos'd to eradicate them by Salivation, which he attempted by a Mercurial Unction, but to no Purpoſe; for though the Patient ſeem'd to find Relief at preſent, a little while after the ſame return as before. A Surgeon (ſays he) in my Preſence made an Inciſion, and took out one of the largeſt out of the Right Thigh, which appear'd to be without any putrid or corrupt Humour, but made up wholly of a ſolid glandulous and white Fleſh, which ſufficiently demonſtrates theſe Adventitious Glands are wholly ſound, though they may be reckon'd in the Number of præternatural Parts. The Subſtance of theſe are like thoſe of the Breaſts, ſoft, ſpongy and white, have Arteries, Veins and Nerves.

The morbous Glands are divided into ſuch as are pendant, concatenated and knit or join'd together, broad or ſpreading in many Places. The pendant or hanging Glands are the *Polypus*, Figs or Warts in the *Anus*, Glands in the Groin, and Excreſcencies or Wattles in ſeveral other Places. The two laſt Kinds in the Opinion of the Vulgar are reckon'd amongſt the malignant Sort. To theſe we may add the *Bronchocele*, and the fleſhy *Hernia*, though theſe more properly belong to the laſt ſpreading Kind. The concatenated Glands deſcend like a Chain of Globules from the Auricles along the Neck to the Clavicles, and appear larger in Children afflicted with the Rickets, in ſtrumous Caſes, and in obſtructed and cachectical Bodies. The morbous ſpreading Glands come under the general Name of *Scrophulous*, which have a great many Differences aſſign'd them by Authors.

Firſt of all they differ, in that ſome of them are of the Colour of the Skin, others diſcolour'd, and the firſt are more benign and mild, the latter Sort are eſteem'd more malign. In the next Place they differ, becauſe ſome are ſoft, and others hard, the ſofter ſubmitting eaſier to a Cure, as being capable to be diſcuſs'd, or brought to Suppuration; but the hard proving ſtubborn and difficult to heal. Thirdly, they differ, becauſe ſome are moveable, others fix'd. The Moveable are thoſe bred and ſituate among the cutaneous Parts; but thoſe plac'd in the Interſtices of the Muſcles, adhering to the Fibres thereof, are not eaſily mov'd, but obey the Motion of the Muſcle; and

thoſe

thoſe which are fix'd to the *Perioſteum*, or the Ligaments of the Joints, are evidently immoveable. Fourthly, they differ, in that ſome are deep, others ſuperficial: Thoſe that are deep belong to the immoveable Claſs, the ſuperficial to the moveable. Fifthly, they differ, becauſe ſome grow in Cluſters, and others ſingly. Sixthly, becauſe ſome are inflammatory, and others ariſe without any Inflammation, and theſe without ſome Violence are perfectly indolent, the oth full of Pain. The inflammatory Glands ry amongſt themſelves, in that ſome incl to Suppuration, others to Induration ſcirrhous and cancerous Diſpoſition; oth to Ulceration, and that either ſimple, ſinuous, carnous, or an Ulcer with a *Car* of the Bones: And this naturally leads into an Enquiry of *ſcrophulous Tumours, Can cers*, &c.

Of the King's Evil, *&c.*

THE *Scrophula* or King's Evil, ſays Mr. *Le Clerk*, is a Tumour which moſt generally makes its Appearance in the Glands of the Neck, as alſo in all the other glandulous Parts of the Body, and conſiſts of a very malignant Nature, the Source of them being commonly ſuppos'd to be in the Glandules of the Meſentery. Theſe ought to be rank'd among the Encyſted Tumours.

The King's Evil, ſays Mr. *Dion*, call'd by the *Latins Scrophula*, and the *Greeks Choirades*, from *Choiras*, which ſignifies a Hog, taken from the Likeneſs of theſe Tumours in Man and the Neck of that Animal, which is fill'd with ſuch Glands. They proceed from a thick Flegm, which is ſometimes acrimonious and ſalt in thoſe which are painful. Children are moſt ſubject to them, becauſe moſt greedy and voracious, and eat oftner than Men: And thoſe Children which live on Pulſe, Fruits, and indigeſted Aliments, are almoſt all ſcrophulous, by reaſon that the Chyle which is produc'd being crude, and not ſubtiliz'd without Difficulty, ſtops in the Poroſities of the Glands where they produce theſe Tumours: Whence 'tis obſervable, that three in four of those which preſent themſelves to be touch'd, are the Children of Peaſants, or at leaſt People that live in the Country, who have contracted that Diſtemper by groſs Feeding.

The King's Evil or *Struma* is cured by a good Regimen or Method of Living, and by general as well as particular Remedies. The Uſe of the *Panacea*, *Mercurius dulcis*, and a diſſolvent Opiate, in Conjunction with the Application of the *Emplaſtrum de Vigo*, on the Gland affected, daily cures it: But if the Humour is obſtinate, foul and acrimonious, and tends to Suppuration, we are to open the Tumour, after having try'd all Ingredients capable of mollifying its Hardneſs. We then dreſs it with corroſive Unguents, which tend to ſcarify, becauſe we are not to expect to procure a Cicatrizing before the Gland is wholly conſum'd.

Explanation *of ſeveral Cuts. Taken from* Bartholin, Rudbeck, Ruyſch, *&c.*

Tab. I.

Fig. I. *Shows the new Lymphatick Veſſels in a Dog diſſected.*

A. The Heart in its Place.
B. The *Vena Cava* deſcending from the Heart.
C, C. The Axillary Vein.
d. The Gullet.
e, e. The Jugular Veins.
F, F. The Lungs on both Sides.
G, G, G, G, G, G. The Lobes of the Liver.
h. The Gall-Bladder.
i. The Thoracick Lacteal inſerted into the Left Axillary.
K. The *Aorta* going out of the Heart.
m, m, m, m. The Guts turn'd on the Left Side.
N, N. The Kidneys.
o, o, o, o, o. The Fat which the Lymphatick penetrates, under which, near the Emulgents, is plac'd the Receptacle, and then the Lacteal Glands.
p. The Iliack Artery.
q. The Deſcending Trunk of the *Vena Cava.*
r. The Ureters about the *Pelvis*, being cut off from the Bladder.
ſ, ſ. The back Parts laid naked.
t, t. The *Vena Porta.*
u, u. The Emulgent Veins.

The other more minute Ducts entring and accompanying the Veins, are not mark'd with Letters, becauſe of their Smallneſs.

By the Right Axillary Vein *C.* a ſingle Branch is inſerted into the fork'd Branch of the Jugular *e, e.* from the Lobes of the Liver *G, G, G, G, G.* Several Winding and Lymphatick Branches paſs through the *Porta t.* and immerge themſelves into the Fat *o, o, o.* Likewiſe the little Lymphatick Branch from the Gall-Bladder *h.* enters the ſame *Porta*, and ſometimes more. Theſe Lymphaticks paſs through the Iliack Artery *p.* and the *Vena Cava q.* with various Windings and Turnings to the Left Side of the Artery by a longer Branch, and here unite themſelves by *Anaſtomoſes*, which are all ſhown through the Fat *o, o, o.* in the Receptacle or Lacteal Glands.

Fig. II. *From* Rudbeck.

A. The Stomach of a Dog.
B. The *Pylorus.*
C, C. The *Duodenum.*
D, D, D. The *Jejunum.*
E, E E. The *Ilium.*
F. The *Cæcum* or Blind Gut.
G, G. The *Colon.*
H. The Beginning or Entrance into the Straight Gut.
I, I, I, I, I. Five Lobes of the Liver.
K. The Gall-Bladder.
L, L. The Kidneys.
M, M. The Emulgents.
N, N. The *Cava.*
O. The *Vena Porta.*
R. The *Veſicula Chyli.*
S, S. The Meſentery.
T, T. Part of the Meſentery broke off, ſo that the Ligature of the Hepatick Ducts may be made.
a, a. The Glandulous *Pancreas* in the Middle of the Meſentery.
b, b. The Carnous *Pancreas*, annex'd to the *Duodenum*, and laid under the Stomach.
c, c, c, c. The Lacteals amongſt the Guts and Glandulous *Pancreas.*
d, d, d. The

Place this Explanation *between Page* 454 *and* 455.

d, d, d. The Lacteals going out of the Glandulous *Pancreas*, and inſerted into the *Veſicula Chyli.*

e, e, e, e, e. The Origine of the Hepatick Ducts out of the Liver.

f, f, f. The Progreſs of them to the Gland *m.* and from that into the *Veſicula Chyli.*

g, g. Two Branches of the *Ductus Choledocus.*

k. The Inſertion of this Duct into the *Duodenum.*

i, i, i, i. The Meſaraick Veins.

m. A Gland ſeated under the *Porta*, containing the Hepatick Ducts.

n, n. One of thoſe Ducts frequently creeping through the Gall-Bladder.

o, o, o, o. The Hepatick Ducts, which cloſely adhering to the *Vena Cava*, enter into the *Veſicula Chyli.*

t. The *Venæ Cyſticæ.*

p, p, p, p. The placing of the Valves in the Ducts.

Fig. III. *From the ſame Author.*

A. The Left Part of the Heart.

B, B. The Lungs turn'd on the Right Side.

C, C. The *Vena Cava.*

D. The Right Axillary Vein.

E. The Left Axillary Vein.

F. Part of the ſame laid open, that the Inſertion of the Chyle Veſſels might appear in View.

G. The *Sternum.*

H. The Left Jugular.

I, I. The *Aorta.*

K, K. The *Veſicula Chyli.*

L. The Hepatick Branches of the *Vena Cava.*

a, a. The Emulgent Veins.

b, b. The *Lumbares.*

d, d. The Crural Veins.

e, e, e, e. The Serous Veſſels, which lead under the *Inteſtinum Rectum* to the *Veſicula Chyli.*

f, f, f, f. The Glands ſeated upon the Crural Veins.

g, g, g. The Serous Veſſels of thoſe Glands tending towards the *Veſicula.*

h, h, h. Muſcles of the ſame Kind proceeding among the Veſſels of the *Abdomen*, which in like Manner enter into the *Veſicula Chyli.*

i, i, i. The Lacteals creeping betwixt the Glandulous *Pancreas* and the Veſicle of the Chyle.

k, k, k. The Glandulous *Pancreas.*

l, l, l. The Lacteals of the Meſentery betwixt the *Pancreas* and the Inteſtines.

m, m. The Chyliferous Duct.

n. An Inſertion of it into the Axillary Vein.

o. The Glands of the *Sternum.*

p, p. The Serous Duct of them opening into the Chyliferous Branch.

q. A Branch of this leading to the Ribs.

r, r. The Glands of the Heart.

ſ, ſ. The Serous Duct of thoſe Glands, which is inſerted into the Chyliferous Duct under the Heart.

Fig. IV.

t. Shows the Forking of the Chyliferous Duct under the Heart, as I have frequently found it.

Fig. V.

x. The Axillary Vein, with the Left Jugular.

u. A triple Inſertion of the Chyliferous Duct.

Fig. VI.

z. A different Ramification of the Chyliferous Duct, as it is found triple in Animals.

Fig.

Fig. VII.

The *Oeſophagus* or Gullet.
The Gland join'd to it.
The Serous Duct or Veſſel taking its Riſe from thence, and inſerted into the Duct.
f, *f*. The Chyliferous Duct.

VIII. *Shows the Lungs join'd to the Heart, ſome Parts of the* Vena Cava *and* Aorta, *and the Serous Veſſels riſing about the Baſis of the Heart, which ſuck up the* Serum *evaporated from the Heart, and depoſite it in the Chyliferous Duct.*

The upper Part or Baſis of the Heart.
The Right Auricle.
The Deſcending Trunk of the *Aorta*.
D. The Aſcending Branches of the ſame.
A Gland ſeated betwixt the Auricles of the Heart.
The Serous Veſſels which ariſe in a Gland applied to the Chyliferous Duct.
g, *g*. The Chyliferous Duct.
h, *h*, *h*. The Serous Veſſels here and there creeping along the Superficies of the Lungs.
I, *I*, *I*. The Lobes of the Lungs turn'd to the Right Side.

IX. *Shows the Lobes of the Lungs in a Dog furniſh'd with Serous Veſſels.*

A, *A*. The two largeſt Lobes of a Dog's Lungs cut out from the Body.
b, *b*, *b*. Infinite Ramifications of the Serous Veſſels on the external Membrane of the Lungs.
c, *c*. The Capillary Branches of the Veins and Arteries of the Lungs ſurrounding them.
D. The Trunk of the Pulmonary Artery cut off at the *Pericardium*, where it enters both Lobes of the Lungs with a triple Branch.

Tab. II.

Fig. I. *Shows the Lymphaticks cut behind, ſideways and lengthways, with their Valves. Taken from* Fr. Ruyſch.

A. A Lymphatick Veſſel cut lengthways.
B. The ſame Cut on one Side.
C. Another cut behind or on the back Part.
a, *a*, *a*, *a*, *a*. The Semilunar Valves in the ſaid Veſſels.

Fig. II. *Shows a Horſe's Liver from the concave Part, with the Lymphatick Veſſels, and their Valves.*

A. The concave Part of a Horſe's Liver.
B. The *Vena Cava* cut off under the Diaphragm.
D, *D*. Both the Conglobate Glands ſeated in the hollow Part of the Liver.
E, *E*, *E*, *E*. The Lymphaticks produc'd from the outward Part of the Liver, and inſinuating themſelves into the fore Part of the Glands.

F. The

F. The Umbilical Veſſel degenerated into a Ligament.

G, G, G. The Lymphaticks taking their Riſe from the back Part of the Glands, and inclining towards the Receptacle of Chyle.

g, g, g, g, g. The Valves very apparent the Lymphaticks.

Fig. III. *Repreſents the Lacteals in a Horſe of the firſt and ſecond Kind, P of the Glands of the Meſentery, and the Receptacle of the Chyle.*

A. The Gland of a Horſe's Meſentery, call'd by *Aſellius* the *Pancreas*, into the fore Part of which the Lacteals of the firſt Kind inſinuate themſelves, but the Lacteals of the ſecond Kind ariſe from behind.

B, B. The Lacteals of the firſt Kind.

b, b, b, b. The Valves conſpicuous in them.

c, c, c. The Roots of the ſame Veſſels ſe rated from the ſmall Guts.

D, D. The Lacteals of the ſecond Kind, which the Valves are more numerous, that in their Form they do not vary f the Lymphaticks.

Fig. IV.

A. A Lacteal Vein, with its Valves *a, a, a, a.*

* A Lacteal Vein open'd.

Fig. V.

A Contains a Portion of the Thoracick Duct of a Horſe, in which the Valves *a, a.* appear.

B. Part of the Thoracick Duct, conſideri the Receptacle of the Chyle in its C vity.

Fig. VI. *Shows the Spleen, with its Lymphaticks and Blood Veſſels tied.*

A. The Spleen of a Calf.

B. The Blood Veſſels and Lymphaticks bound.

C. The Splenick Vein.

D. The Splenick Artery.

E. The Splenick Nerves, the Number which is uncertain.

F. The Lymphaticks riſing on the outwa Part of the Spleen.

f, f, f, f. The Valves in the ſame Veſſels.

G. The Ligature.

A

Treatiſe of the King's Evil, *with its Methods of Cure. From Mr.* Wiſeman, *Serjeant Surgeon to King* Charles *II.*

THE *Latins* call this Diſeaſe *Struma* and *Scrophula*, and define it to be a hard and glandulous Fleſh, ſomewhat white, that riſes in the Neck, under the Arm-pits, *&c.* It is contain'd in a *Cyſtis* or Bag, and the like; none of which ſeem ſufficient to expreſs the Diſeaſe we call the *King's Evil*; for there are many Tumours and Ulcers commonly known to be the Evil, which are contain'd in no Cyſtis at all, neither do they concrete into a Gland. I inſtance in the Swelling of the Glands, divers Tumours by Congeſtion in the Glandulous Parts of the Body, others in the Bones, *&c.* ſo that we muſt either exclude theſe, or alter our Definition: Therefore I ſhall endeavour to fix upon a peculiar Acidity in the *Serum* of the Blood for my Specifick Difference, and deſcribe the King's Evil to be a Tumour ariſing from a peculiar Acidity in the *Serum* of the Blood, which, whenſoever it lights upon Glandule, Muſcle or Membrane, coagulates and hardens; when it mixeth with the Marrow, it always diſſolves it, and rotteth the Bone. If this acid Humour be ſimple, the Diſeaſe is a ſimple *Struma*; if join'd with a Malignity, or any other Humour, it makes a mix'd Tumour, as a malignant *Struma*, *Phlegmon*, *Scirrhus*, *Oedema*, *&c.*

Now by a Coagulation, I mean ſomething diſtinct from Concretion, which is incident to all other Humours and Tumours, and to the *Serum* it ſelf upon many other Cauſes, the whole Blood being fibrous, may admit of many Concretions; but they differ from this Coagulation as much as the boiling of Milk up to a Thickneſs, or thickening it with Flour, differs from making a Curd with Rennet. I the rather inſtance in Milk, becauſe of its near Analogy to Blood, and alſo for the near Reſemblance ſtrumous Tumours have with the Curd of that. It is very common to ſee the leſſer Glandules of the Neck grow large, and fill with a white Curd ſo exactly like that of Milk, that it is hard to diſtinguiſh them. When they differ from this, it is from ſome other Mixture in the Blood, which makes ſome other Alteration; which may be very various, whether in the Nature of the Matter coagulated, or the coagulated Ferment, which latter may be an Acidity of this or that Sort, and ſometimes ſo ſharp as to approach near to the Acrimony of *Aqua fortis*, in which Caſes the Patient feels violent Corroſions and hideous Pains, the Tumour it ſelf being apt to degenerate into a *Cancer*, or may have other Mixture with it, to make it of a vitriolick or aluminous Nature, all which Acidities, though they agree in the common Notion of coagulating, yet they make Coagulations very unlike each other.

The immediate Cauſe of this Diſeaſe being already premis'd, the remote Cauſes are to be attributed to Air, Diet, Exerciſe, natural Conſtitution, hereditary Affections, *&c.* Thoſe who are born of ſtrumous Parents are uſually ſubject to theſe Diſeaſes, and derive it from them: So they will from a Nurſe ſo diſeas'd, whoſe Milk they ſuck'd. Thoſe whoſe Temper of Blood is acid, and the *Serum* apt to coagulate, are very obnoxious: So are Ricketty Children, and indeed all Children are apt to have their Aliment coagulated. Thoſe who live in an Air exceſſively thin and ſharp, or very thick and foggy, are both liable to the ſame Diſeaſe; and ſo are ſuch as eat over ſalt or ſowr Meats. Want of Exerciſe is a great Cauſe of the Blood's growing acid and ſlimy; and ſo are external Accidents, always ſup-

ſuppoſing a Prediſpoſition of the Body to it.

The King's Evil being thus ſuccinctly deſcrib'd, we ſhall give an Account of the Parts themſelves which are concern'd in it, which are either the Glands, Muſcles, *Viſcera*, Membranes, Tendons, or Bones. The Veins and Arteries do indeed dilate themſelves in all Congeſtions of Matter, whether natural or præternatural, but have not any particular Affection in the *Strumæ* diſtinct from what they have in other Caſes. The Glands are the moſt remarkable Seat of this Diſtemper, inſomuch that Authors generally confine it to them. Here we have a great deal to ſay, *viz.* that this Part is moſt commonly affected whenever the Patient is ſtrumous; and if the outward and more viſible Glands remain whole, yet generally ſpeaking, the inward ones, thoſe eſpecially of the Meſentery, are obſtructed and ſwell'd: Nor is the Meſentery alone, but all the conglobated Glandules partake with it, which Word *Sylvius* hath appropriated to the reductive Glands that ſerve the *Lymphæducts*. Theſe are frequently liable to this Diſeaſe, their Offices being a Percolation of the *Serum*; therefore whenever that is amiſs, theſe muſt needs ſuffer. This is outwardly viſible in the Neck, on the Sides of the *Muſculus Maſtoidæus* quite down to the Clavicle, whence they paſs into the *Thorax* down along the *Spine*, and about the Lungs, which alſo do frequently abound with ſtrumous Coagulations.

It is eaſy to be ſeen in the Groin, *Axillæ*, *&c.* in both which Places they do often appear, but no where more commonly and frequently than in the Neck, of which every Author produces Examples: Nor are the conglomerate Glands free of the like Malady, under which Name *Sylvius* reckons all the excretory ones, which are the ſalivatory Glands, the *Tonſillæ*, *Glandulæ lachrymales*, the *Thymus*, *Pancreas*, Breaſts, Teſticles, and *Proſtates*. The *Glandulæ lachrymales* are often infected, and do, according to the Variety of their Diſorders, produce ſeveral Sorts of Tumours about the Eye, as the *Lippitudo*, or Diſorder at the Ends of the lachrymal Veſſels, the *Ophthalmia*, the *Fiſtula lachrymalis*, *&c.* Beſides all theſe in the Glands, there are ſeveral more which do ariſe Account of this Diſeaſe in the ſeveral ſtices of the Muſcles, as I have ſeen in the Arms of one Perſon, near the *M biceps*. The like happens to others Legs and Feet, alſo the very Finger Toes.

The *Viſcera* are often found with *Struma's* growing in them, or from t nor are we to wonder at it, if *Malpig* Doctrine be true, who ſuppoſeth m the *Viſcera* to be made up of Glan In them we frequently find ſtrumous lings, as in the Liver, Lungs, Spleen, ſometimes Appendants to them. Dr. *ter Needham* declared in one of his Le at *Surgeons Hall*, that he ſaw a ſtru Swelling at the Cone of the Heart weigh'd two Ounces. The Tendons are ſo times involv'd with a Collection of ſtru Matter, eſpecially the Fingers, Hands, and Toes. Bones are as frequently affe as any Part of the Body, Glands onl cepted: But there the Manner of the mour differs; for though the Bone ſw and the outward Shell thereof appear h yet the inward Juices are all putrid and r ten. Bones are likewiſe affected on Outſide by any ſtrumous Tumour th toucheth them, whether Membrane or Te don, *&c.* which we often experience opening of them when they lie near ſuc Parts; for when we do, we moſt commo ly find the Bone it ſelf bare, if not c rious.

As to the Differences of the *Strumæ*, they a ſometimes more mild, without Inflammatio or Pain, and moderately hard, but by Ac ceſs of Heat, inflame and ſuppurate. Som of the mildeſt and biggeſt *Strumæ* I hav ſeen perfectly ſuppurated without Chang of Colour in the Skin, but after ſome Day they again became hard as before. Whe they ſuppurate with Inflammation, there i a Mixture of Blood with them, and the are call'd *Phlegmonides*. Others are indur ted, and after a while ſcirrhous, yet ſome times ferment by a putrid Heat, and grow painful and ſoft in the upper Part, which Softneſs hath by ſome been miſtaken for a Suppuration; but at their opening they on ly gleet, and at length too frequently ſhew ma-

malign Quality, by terminating in one of the Species of *Cancers*. Other Differences may be taken Notice of, *viz.* that ſome are primogenial, as when the Diſeaſe is original; and ſecondary, when they ſucceed ſome other Diſeaſe, as particularly a Fever, which often terminates in a Congeſtion of Matter. It alſo ſometimes happens after Catarrhs, and other Diſtempers.

The Signs of theſe Tumours will be more difficult to underſtand, becauſe of the various Shapes in which they appear. When the Diſeaſe affects a conglobate Gland, the Tumour is uſually round, moderately hard, and moveable, without Pain. Thoſe of an oval Figure, which are hard, and attended with Pain without Inflammation, are of an ill Quality; and if they grow unequal, they threaten a *Cancer*. When a conglomerate Gland is the Seat of it, it uſually obſerves the Shape of that Glandule, eſpecially if the whole Gland be diſeas'd: But it is not unfrequent to ſee thoſe Glands, which are indeed but Compoſitions of leſſer Glandules cluſter'd together like a Bunch of Grapes, particularly affected; ſo that ſome of thoſe leſſer *Glandulæ* or Kernels ſhall ſwell into oval, round, flat, or other Shapes, leaving the Remainder ſound enough, as indeed having no other Communication with them, but only by that ſmall *Pedunculus* which tieth them to, and diſchargeth them by, the common great Duct of the Gland. In a Muſcle the Shape is uncertain, and always diſtinct from the Muſcle, the Tumour harder or ſofter as it happeneth; but thoſe of a round Figure are the beſt condition'd ones. The Lip, when infected, is commonly thick and chop'd: Bones, when ſtrumous, are apt to ſwell, grow big and hard; but if you open them, they are found inwardly rotten.

In the Prognoſticks of this Diſtemper, you are to conſider, whether the Tumours are many or few, whether grown together in Cluſters or more diſtinct, great or ſmall, deep or ſhallow, moveable or fix'd, benign or malign, ſoft or hard; the Situation of them, whether near great Veſſels, Joints, Nerves, Tendons, or Bones: And the Habit of the Body is to be conſider'd; alſo the Age of the Patient. If the Habit of the Body be tolerable, the Patient young, the *Strumæ* recent, and but moderately hard, the Reſolution or Suppuration of them is feaſible; but if they have been of long Continuance, are hard, and lie deep amongſt the Veſſels, the Work is difficult; yet the Cure of both is very often aſſiſted and brought forward by accidental Ferments, which will reſolve them to a Wonder, and as often ſuppurate them. If the *Strumæ* have been long ulcerated, and are become ſinuous and virulent, and they lie near one another, they do often find a Communication to one another, though to the Eye they may ſeem diſtinct; in which Caſe the Lips grow callous, and the Ulcers corroſive, nay frequently ſordid, and the Cure not to be hop'd for as long as any one *Cyſtis* remains, or indeed the Veſſels that feed them. Thoſe that are ſeiz'd with *Strumæ* in the Neck after forty Years of Age ſeldom recover, they generally labouring under great Obſtructions, whence ſpring ſcorbutical Affections, Jaundice, Fainting, Vomiting, Loſs of Appetite, ſometimes Dropſy, other while a Cough, in which Caſe they dye Tabid. If ſtrumous Tumours or *Gummata* ariſe from *Caries* in the Bones of the Fingers or Hands, it will require your Care; if in the Foot or Toes, it will be more difficult; if in the *Os Calcis*, Joint of the Ankle, or *Aſtragalus*, or in the Knee Bones, or *Iſchia*, *&c.* where you cannot lay open, or indeed where you cannot judge of the Rottenneſs, the Caſe is deplorable, the Work is long, and the very Diſcharge of Matter exhauſts the Spirits of the Patients, ſo that they generally die of a *Maraſmus*: But if by Strength of Body, and Help of Medicines, the Ulcers digeſt, ſometimes the rotten Bones moulder and caſt forth, and by Vertue of a *Callus* within, the Member is ſupply'd, as in ſome Caſes you may ſee; but ſuch a one always portendeth Danger. If ſtrumous Tumours or *Gummata* do outwardly foul the Bones, if the Habit of Body be tolerably good, and the Ulcers well handled, they may recover; but if the Habit of the Body be bad, new Ulcers ariſe, ſo that the Work is long and difficult.

Of the Method of curing the King's Evil. *From the ſame Author.*

IN the Cure of the King's Evil, you muſt conſider the Habit of the Body, Strength and Age of the Patient, the Affection of the *Viſcera*, and particularly, whether the *Struma* be ſimple or complicated. In order to the Cure, Three Intentions are required: The Firſt conſiſts in the Regimen of Diet, and the other Nonnaturals; The Next in Pharmacy or internal Preſcriptions; and the Third in the Application of Externals, either to diſcuſs, ſuppurate, or extirpate the Glands. In the Firſt, concerning a general Regimen of Diet, Regard ought to be had to the Conſtitution of the Patient, whether he be hot or cold, moiſt or dry, old or young, and ſo his Eatables and Drinkables order'd accordingly, remembring to avoid Water, and make Uſe of the moſt generous Wines, or beſt brew'd Malt Liquors. Air is a great Help in the Cure of this Diſeaſe, if rightly choſe, according to the Temperament of the Patient, being neither too ſharp, or too thick or foggy. Likewiſe Exerciſe of Body ought to be enjoin'd with Moderation, it being neceſſary to waſte Superfluities, and give a briſker Motion to the Parts. Sleep is highly prejudicial in the Day-time, and the Paſſions of the Mind ought to be ſo govern'd, as to encourage nothing but Mirth and Pleaſantry.

The Second Intention, conſiſting in Pharmacy, muſt be conſider'd as the Firſt, according to the Strength, Age, and Conſtitution of the Body, ſome requiring gentle Means, and others the ſtrongeſt Catharticks. The Purgatives to be us'd may be ſuch as theſe: *Species Hieræ cum Agaric. Pulv. Cornuchini, Pil. Cochiæ, ex duobus, Rudii, &c. Diagrid. Reſin. Jalap. & Merc. dulc.* and all thoſe Medicaments preſcrib'd in the *Lues Venerea.* R. *Pil. Rudii, vel e duobus, Scrup. Calomel. gr.* xv. *Ol. Saſſafras, gut.* iij. Make five Pills of them to be taken in the Morning. Or Take, *Sena*, half an Ounce; Troches of Agarick, one Dram; Hermodactils, four Scruples; *Carthamum* Seeds, three Drams; Salt of Tartar, half a Dram; Saſſafras Wood, two Scruples; infuſe in Broom Flower Water, ten Ounces: To the ſtrain'd Liquor an Ounce and two Drams of Syrup Buckthorn. Or Take, Turbith and Hermodactils, of each two Drams; Roots of *gelica*, three Drams; *Diagridium*, two Dra make a Powder, and with Syrup of R ſolutive make an Electuary, to be take Dram or two for a Doſe twice a Day, v 10 or 16 Grains of Calomel ſometi Or this Purging Wine: Take, Tops of M joram, *Origanum*, Calamint, Tamarisk, each a Handful; Damask Roſe Flowers, S Betony, Roſemary, Stœches, Centaury, each half a Handful; White Poppy S three Drams; ſweet Fennil, black Cumm *Cardamums*, Cubebs, of each one Dra Roots of *Florentine* Orrice, *Calamus arom cus*, Pellitory of the Wall, of each half Ounce; dried Orange Peel, Saſſafras, of ea two Drams; Hermodactils, Turbith, of ea two Ounces; black Hellebore, three O ces; ſteep them in two Quarts of *Spa* Wine four Days, to be taken Morning a Evening, Doſe three or four Spoonfuls. T *Species* of *Hieræ Picræ*, one Ounce and a ha Winter Bark bruis'd, half an Ounce; let th infuſe cold for three Days in half a Pint Earthworm Water, *Aqua mirabilis*, and B ony Water compound, of each a Pint ſhake 'em often, and make a clear Tincture

Alteratives are alſo uſefully taken tho Days they do not purge, of which Sort th is very much commended: Take, Roots Gladwin candied, one Ounce; Vipers Aſhes, ſix Drams; Sponge Aſhes, half an Ounce; Species of the Gems, one Dram; *Diarrhodon Abbatis*, two Drams; make an Electuary with Syrup of Betony, of which take the Size of a Cheſnut three times a Day, faſting after. Or Take, Roots of Elecampane, Gladwin, and Orrice, of each one Ounce; Conſerve of Roſemary Flowers and Betony, of each ſix Drams; *Venice* Treacle, three Drams; *Species Aromat. Roſat. Diatragacanth*, of each one Dram; with Syrup of Citron Peel make an Opiate, whereof take three Drams at Bed-time. After any of theſe may be drunk a Draught of the following Decoction: Take, *Sarſaparilla*, three Ounces; *Guajacum*, one Ounce and a half; Saſſafras, ſix Drams; Roots of *Filipendula* and *Scrophularia*, of each an Ounce; Agrimony, Herb *Robert*, and *Paul*'s Betony, of each half a Hand-

Handful; Flowers of Betony and Roſe-ary, of each a Pugil; Liquorice, two unces; Coriander Seed, ſix Drams; boil em in Spring Water to three Quarts, to e ſtrain'd add *Rheniſh* Wine a Quart, and ink about half a Pint of this twice or rice a Day. The Decoction of *Guajacum* Flegmatick Bodies often cure the ſimple *ruma* without any other Aſſiſtance, unleſs metimes, to make it more grateful, you d Raſp'd Ivory or Hartshorn, with Rai-ns in the Sun, a little Liquorice, and a uantity of Mellipedes. In ſome Caſes the me Water excels every Thing elſe, made ith *Salſaparilla*, *China* Saſſafras, Liquorice, d Raiſins. In delicate Conſtitutions you ay leave out the Saſſafras, and make Emul-ons of it with the cold Seeds, Almonds, *&c.* Chalybeates are frequently us'd in this Diſ-eſe, and may be thus given: Take, Pearl repared, ſix Drams; Crabs Eyes, one Ounce; Ceruſe of Antimony, half an Ounce; Salt of Steel or Iron, three Drams; White Sugar Candy, four Ounces; make a owder. Or Take, Steel prepar'd with Sul-hur, the beſt Rubarb, of each ſix Drams; Winter's Bark, two Drams; Salt of Worm-wood, one Dram; fine Sugar, four Ounces; ake into a Powder, whereof take a Dram. f the Patient is of a hot Conſtitution, the aſe is more difficult, becauſe the Medicines moſt efficacious in this Diſeaſe are generally hot and drying; as the Woods, Barks, Gems, Salts, *&c.* in which Caſes Aſſes Milk may be allow'd, whereof I ſhall give you one Inſtance:

A young Gentlewoman about 11 Years old having this Diſeaſe grievouſly in her Neck, with Obſtructions in the Meſentery, was conſiderably emaciated. Sir *Fr. Prujean* being ſent for, and ſeeing her in that Con-dition, adviſ'd her to be remov'd to the freſh Air at *Kenſington*, where, by drinking of Aſſes Milk, ſhe recover'd her Strength, and return'd to her Friends in a good State of Health. Where Aſſes Milk does not agree, we preſcribe Milk Waters, with the Altera-tives, and Decoctions of *Sarſa*, Sanders, Raſp'd Ivory and Hartshorn, with the more temperate Pectorals and opening Roots; ſo alſo the Teſtaceous Powders, with the Ce-ruſe of Antimony, *&c.* together with Bal-ſamicks, Pearl Juleps, and Opiates. Purging in this Caſe, if the Body require it, ought to be with Lenitives; as *Caſſia*, *Manna*, Syrup of Apples or Roſes ſolutive, Syrup of Succory, with Rubarb, *&c.* But in the moſt deplorable Caſes, where the Patient is al-moſt worn away to a Skeleton, I have re-cover'd them by a Salivation, as you may ſee in my Obſervations of Ulcers with *Ca-ries* in the Bones.

The Third Intention is perform'd by Ex-ternals: 1. To the Tumours which we en-deavour to reſolve or ſuppurate, or to extir-pate, which latter may be perform'd either by manual Operation, or by Eſcaroticks or Cauſticks. 2. To the Ulcers which are the Effect either of Suppuration or Extirpation. In Tumours we ſhall begin with Emollients and Diſcutients, and offer only ſuch to you as we have applied with tolerable good Succeſs; as, the *Empl.* of *Diachylum irreat.* with *Gum. Galbanum Ammoniacum*, *&c.* Or elſe, *Galbanum*, Sulphur vive, of each one Ounce; *Sal Armoniac* two Scruples; Turpentine, as much as will make it a Cerate. The ſofter *Strumæ* may by theſe or the like Means be reſolv'd or diſpos'd to Maturation, by the Acceſs of Heat, and Subtleneſs of the Me-dicine. Thoſe which partake of the *Phleg-mon*, do frequently ſuppurate by the Uſe of Onions, Garlick, Lilly Roots, Marſhmal-lows, Fænugreek, Linſeed, made into a Pul-tiſe with Gooſe Greaſe or Lard, and a little Saffron. As to the Way of opening them when ſuppurated, that by Inciſion makes the leaſt Scar; but if the *Strumæ* be large, the Way by Cauſtick is the beſt. In old and hard *Strumæ's*, we ſeldom obtain a compleat Suppuration. Sometimes during the Application of the moſt ſubtle Diſcutients, we raiſe a Heat in the Skin, which affecting the *Cyſtis*, and Part of the Gland next un-der it, cauſes an imperfect Suppuration, and by the continued Uſe of Diſcutients, it at length frets its Way through in ſmall Aper-tures; in which Caſe, if you continue the Applications, they grow bigger, and become ſo many painful Ulcers, ſpreading one into another, the Body of the Gland remaining hard, without Hopes of Suppuration. If the *Struma* be moveable, and free from re-markable Veſſels, the ſpeedieſt Way of Cure is by cutting the Skin, and taking them out whole with their *Cyſtis*. Thoſe which have

Stalks, and are pendant, or grow ſmall near the *Baſis*, may be tied and cut off.

The common Way of taking out all the *Species* of the *Strumæ*, *Atheromata*, and *Meliceris*, by Inciſion, is in cutting the Skin the Length of the Tumour. In theſe latter you muſt make the Inciſion more warily, leſt you divide the *Cyſtis*, and the Matter flow forth. After you have ſeparated them round to the *Baſis*, it may be ſometimes neceſſary to make a Ligature upon the Veſſels before you cut them off. Thoſe which are of a great Bulk, and have their *Baſis* proportionably big, as *Steomata*, generally call'd Wens, are ſometimes taken out by making a croſs Inciſion, other times by an oval one, taking off ſo much of the Skin as may be judg'd ſuperfluous; then ſeparate it. Proceed calmly in the Work for in theſe the Skin commonly adheres ſo cloſe to the *Cyſtis*, that it will not part from it without the Help of your Knife. Having ſeparated it, turn it out, and make a Ligature underneath upon the Veſſels, and cut it off; then bring the Lips of the Wound together with two or three Stitches, and dreſs it up as you ſee Cauſe. Where the *Strumæ* are large, or lie deep near conſiderable Veſſels, there, if Extirpation be ſafe, the beſt Way will be by Cauſtical Medicines and Eſcaroticks. It is a Work requiring more Time, yet it is ſure, and indeed is the only Way our Patients generally admit of, the very mentioning of a Knife frightening them from us. Our Misfortune is, that all Medicaments fit for this Purpoſe are very painful. Of theſe, ſome are made of Soap Lees, Arſenick, Sublimate, Vitriol, *&c.* That of Quick-lime boil'd with Soap Lees ſpreads leaſt. The Remedies afterwards to eradicate them, are either Eſcaroticks, as the Cauſtick Stone, Mercury, Sublimate, *Auripigmentum*, *&c.* or Cathereticks, the moſt common of which are Turbith Mineral, Red Precipitate alone, or mix'd with Burnt Allum. The mildeſt is the Precipitate, being ſlow of Operation, but may ſerve in tender Bodies.

As to the *Strumæ*, and other præternatural Tumours included in a *Cyſtis*, affecting the Muſcles, Tendons, Ligaments, and other Parts of the Body, they differ not in the Way of Cure from what hath been alrea deliver'd, ſave that they require more C tion in the Extirpation of them, as they fect the Joints or ſenſible Parts. The Sw ling affecting the Joints in this Diſeaſe of two Sorts: Both of them are made Congeſtion, and increaſe gradually; yet d fer, in that the one ariſeth externally up the Tendons, and between them and Skin, or between them and the Bone; t other internally within the Bone it ſelf.

Obſervation upon the Diſcuſſion of Struma.

A Youth aged about thirteeen Years, of ſtrong Habit of Body, was commend to me, having a *Struma* of an oval Figur on the Right Side of his Neck, under hi Ear. He had alſo an *Ozæna*, with a thic chop'd Upper Lip. I purg'd him with th Infuſion of *Sena*, *&c.* and afterwards wit one of the ſpecifick purging Powders, to which I added *Calomel*, and enjoin'd him th Decoction of *Sarſæ*, *Guajacum*, *&c.* with ſtrict drying Diet, and made him a Fonta nele in his Arm. I embrocated the Gland with Neat's-Foot Oil and Vinegar, and ap plied a *Diachylon* Plaiſter, with Orrice ma lax'd with *Cerat. Oeſypi.* By this Method the *Struma* relax'd, and ſeem'd to be divided into three ſmall Glands, which alſo reſolv'd ſoon after. The thick chop'd Lip was cur'd by the anointing it with Precipitate, mix'd with *Unguent. Roſat.* After it was cur'd, I perceiv'd his Noſe ſwell'd and hard: I look'd upon his Noſtrils, and ſaw them contracted very ſmall, and ſtuffed with a cruſty Matter. I directed ſome Oil of Lillies to be ſnuffed up his Noſtrils, and the next Day caus'd them to be ſyring'd with Barley Water, Linſeed, and *Althea*; purg'd him the next Day with *Extract.* of *Rudii*, and *Calomel.* repeating it every other Day, and continued the drying Decoction with Antimony, Diaphoretick, and ſuch like. His Noſe being cleans'd of its *Mucus*, I ſyring'd it with one of the Errhines commonly us'd in the *Ozæna* from a Venereal Cauſe, and thereby heal'd the Ulcers.

Ob-

Obſervation of a Diſcuſſion and Suppuration mix'd.

A Child aged about ſeven Years, having been ſome Time diſeas'd with Obſtructions in her Meſentery, *&c.* and a hard *Struma* of an oval Figure moveable under her Chin, Dr. *Dacre* and my ſelf were conſulted. We made her a Fontanel in her left Arm, and preſcrib'd one of *Celſus Amalgama's*, which we applied on the Gland, and ſet her down this following Courſe of Phyſick: Take, Reſin of Jalap, five Grains; Calomel, ten Grains; Conſerve of Damask Roſes, two Scruples; Syrup of Violets, as much as is ſufficient for a Bolus: To be taken in the Morning with Care; after which uſe the following Diet Drink: Take, *Guaiacum*, *Sarſa*, of each two Ounces; Saſſafras, one Ounce; *Scrophularia* and *Filipendula*, of each three Handfuls; ſharp-pointed Dock, Butchers Broom, Polipody, of each two Ounces; Betony, Sage, Nettle-Mallows, of each two Handfuls; Roſemary, Marjoram, of each one Handful; Galangal, an Ounce; Nutmegs, half an Ounce; Raiſins, half a Pound; Millipedes, five hundred; beat 'em a little, and hang 'em in a Bag in three Gallons of Ale, and after four Days uſe it for your ordinary Drink. Take half a Scruple of Antimony Diaphoretick in a Spoonful of the ſaid Drink Night and Morning. By the Application of the Emplaiſter, Part of the Gland reſolv'd, and Part diſcharg'd it ſelf in a thin Humour, fretting through ſmall Pin Holes in the Skin. After it was thus totally waſted, I cicatriz'd the Frets with Ointment of Tutty; during which ſhe recover'd her Health.

Obſervation of a Struma *ſuppurated.*

A Child of about four Years of Age being internally diſeas'd with a Cough, *&c.* was put into my Hands for Cure of a *Struma* on the Right Side of his Neck, near the Bigneſs of a ſmall Pullet's Egg. I purg'd him with *Syrup. Diaſereos* diſſolv'd in a Pectoral Decoction, and preſcrib'd Lohochs; alſo Phyſical Ale, *Bezoar*, *Mineral*, *&c.* Externally I embrocated with *Unguent. Magiſt. ad Strumas*, and applied *Cerat. Agrippin.* by which Method the *Struma* reſolv'd, and the Child recover'd that Summer in the Country by repeating the Internals above-mention'd. But above a Year after he return'd to Town diſeas'd with a large *Struma* on the ſame Side of his Neck, and internally obſtructed with the ſaid Diſeaſe. Antitraumaticks were preſcrib'd in order to the removing thoſe Obſtructions; the *Struma* was ſuppurated, the Matter let out, and the remaining Body eradicated. The Ulcer diſpos'd to cicatrize; during which, the Child not taking thoſe Internals deſign'd, the Obſtructions increas'd, and he died before the Ulcer cicatriz'd.

Obſervations of Inciſion of a Meliceris, *&c.*

A Man of about 45 Years of Age came to me with a round Tubercle, without Inflammation, between the Sagittal and Coronal Suture. I open'd it by Inciſion, and diſcharg'd firſt a yellow *Serum*, then a gritty Matter like Honey. I wip'd away the Blood, and preſs'd out the Matter, then dreſs'd it with Doſſils ſpread with *Baſilicon*, dip'd in Precipitate, and thereby digeſted out the *Cyſtis*, and cured it ſoon after by the common Method.

A Man of about 30 Years old came to me with an *Atheroma* on one Side the Left Temporal Muſcle. I open'd it by Inciſion, and digeſted it with *Mundif. Paracelſi.* He had alſo one near the Coronal Suture, which had been formerly open'd by Puncture, and remain'd ſinuous and full of looſe Fleſh. I laid it open by a Snip of a Pair of Sciſſars, and deterg'd, incarn'd and cicatriz'd them both, according to the uſual Method of curing ſuch Ulcers.

A Gentleman came to me one Evening with a *Steatoma* a little above the Coronal Suture. I ſlit the Skin with a Lancet, and thruſt it out with its *Cyſtis*, then applied a Pledget with *Baſilicon*, over which he put his Peruke on without further Concern, and cured himſelf in few Days.

A Gentleman aged about 63 Years having been ſome conſiderable Time diſeas'd with a *Sarcoma* on his lower Lip, conſulted me, with

with Dr. *Fielding*, an eminent Phyſician of *Glouceſter*. It had formerly been attempted by Eſcaroticks, and by Exſiccants; but it return'd, and thruſt forth Excreſcencies, one whereof was not unlike a Strawberry. They were accompanied with Tumour and Hardneſs, and would not cicatrize by any Application, but grew up, and ſpread under a cruſty Scab, which frequently fell off of it ſelf. We reſolv'd upon the Extirpation of it; to which Purpoſe the Doctor prepar'd his Body by purging, *&c.* Then, in order to the Work, the Patient being plac'd in a Chair to the Light, I mark'd out ſo much as I deſign'd to cut off, then took hold of the Lip between my Thumb and Forefinger, and preſſing the *Sarcoma* outward, I cut it off with a Pair of Sciſſars; upon which, I ſaw the remaining Roots ſtart up in a Ridge of looſe Fleſh. I preſs'd them upward, and ſnip'd them off. Then, after I had permitted the Arteries to empty themſelves a while, I ſtop'd them by the Application of Doſſils, preſs'd out of Tincture of Sweet Vitriol, and with *Pulv. Galen. cum Album Ovi*, dreſs'd the Wound up. From that Time it bled no more. The third Day I took off the Dreſſings, and ſaw the Wound well diſpos'd to digeſt. I dreſs'd it with Digeſtives of Turpentine, *&c.* and from that Time deterg'd it with Precipitate and Vitriol Stone, cicatrizing it with Ointment of Tutty and the Allum Stone, and ſo it continues to this Day.

Obſervation of Strumæ *extirpated by Cauſtick.*

A Perſon of about 19 Years old had many *Strumæ* on both Sides of her Neck, one eſpecially very large on the Left Side, reaching from her Ear downwards, of an oval Figure; the Extirpation whereof having been attempted in the Country by Knife and Eſcarotick unſucceſsfully, ſhe was brought to *London*, and put into the Hands of Dr. *Walter Needham* and my ſelf. The Phyſician began with purging her with Tamarins, *Sena*, Rubarb, *Manna*, *&c.* with a Diet Drink of Rubarb, *Sena*, Hermodactils, Ginger, and Raiſins in the Sun; then a drying Courſe of the Woods, to be continued twenty Days, taking every ſo Night at Bed-time two Scruples of *Pil. mach. cum Gummis.* After her Body was prepared, we deſign'd to have taken out *Struma* by Inciſion; but it lying deep, the upper Part of it being grown to Skin by reaſon of the former Attempts, applied a Cauſtick according to the Le of it, defending it from ſpreading. Eſcar being made as we deſign'd, I divi it, and began to raiſe it off, with Intent to take out the *Strumæ*; but ſhe grow impatient of the Smart, I rub'd deep i the Body of it with a Cauſtick Stone, a fill'd that Eſcar with Precipitate, apply Pledgets of *Baſilicon* over it, then embro ting the Parts about with Oil of Roſes a Vinegar, dreſs'd up with Plaiſter of Bo Compreſs and Bandage. The fourth D we open'd it again, and repeated the Uſe the Cauſtick Stone and Oil of Vitriol i terchangeably, penetrating thereby deep ev Way into the *Strumæ*, then dreſs'd it u with Lenients as before. By this Way Dreſſing, we eradicated the *Struma*; and a terwards, by rubbing it with Vitriol Sto here and there where any little Relick of i appear'd, and dreſſing it with Doſſils dip'd in Precipitate, we digeſted it. I then bein oblig'd to a Journey into the Country, le the finiſhing of the Cure to my Kinſma *Jacques Wiſeman*, who, by leſſening the Doſſils gradually, permitted the Ulcer to hea within, and by Epuloticks and Bandage brought the Lips to unite, ſo that at my Return I ſaw it cicatriz'd, ſmooth and narrow, and the *Struma* totally eradicated. The other *Strumæ*, which had been big, ſeem'd alſo well nigh reſolv'd; yet upon the cicatrizing that Ulcer, ſhe was ſeiz'd with an *Eryſipelas* on her Head and Face, which ſwell'd them extraordinarily; but by purging the Phyſician remov'd that.

Obſervations of ſtrumous Ulcers on both Sides of the Neck, on the Head and Lips.

A Gentlewoman aged 34 Years, of a ſickly weak Conſtitution, ſubject to the King's Evil many Years on both Sides of the Neck, which ulcerating, and the Ulcers paſſing their

ir Matter one into another down to the rvicles, had gone through long Courſes Phyſick, and had permitted divers Appli-ions to be made, which proving unſuc-ſful, ſhe put her ſelf under the Care of *Fr. Prujean* and my ſelf. The Ulcers m'd to have riſen from ſo many diſtinct ands, and after Suppuration the Matter owing virulent, corroded under the Lips, d both render'd them ſinuous, and at gth callous, and conſequently not capable Cure but by laying open; yet I began th Digeſtives, Diſcutient and Drying Fo-entations. The Phyſician preſcrib'd Lenient rgatives, with the Addition of *Calomel* e in four or five Days, and on the inter-itting Days, *Decoct. Sarſa*, with Antimony aphoretick. Theſe not anſwering our Ex-ctations, I proceeded in the laying open e Ulcers, and removing the callous Lips, ere being not one that would cure till that s done. Afterwards they digeſted, in-rn'd and cicatriz'd from the Edges firm d ſmooth, by the common Method of eſſing Ulcers.

A Woman came out of the Country with diſeas'd Child of two Years old. She had rought many into the World, but they had en all lamentably diſeas'd, and died one fter another. This was broken out all over e Head, and ulcerated in many Places to e *Pericranium*. It had alſo a large white umour lying deep under the Left Jaw to e *Trachea Arteria*. I fomented the Head with a Decoction of Cephalick Herbs, with lowers of Red Roſes, Myrtle Berries, Ba-auſtians in Wine and Water, and dreſs'd e Ulcers accordingly as they required, ſome with Digeſtives, others with Deterſives, and others with Epuloticks; and to the Tumour I applied Diſcutients. During theſe Appli-cations, I purg'd the Child once in four or ive Days, giving it four or five Grains of *Calomel* over Night, and in the Morning Syrup of *Rubarb* in a Medicated Ale of *Sar-ſa*, Lentisk Wood, *&c.* and the intermitting Days, *Bezoar*, *Mineral*. Before I put her in-to this Courſe, the Humours were ſo acrimo-nious, that the leaſt Scratch with a Pin ter-minated in a corroſive Ulcer; but after ſhe had proceeded in this Method a while, they all heal'd, ſo that there remain'd only the Tumour under the Jaw, which ſeeming full of Matter, I thought reaſonable to open; but ſhe having privately conſulted ſome Per-ſon, who, in Conſideration of its Situation, thinking it dangerous, diſſwaded her from it, upon Notice whereof I left them: But ſome Weeks after, having tried other En-deavours unſucceſsfully, ſhe came to me again. The Child being broken out for Want of proſecuting the former Method of *Calomel*, *&c.* and alſo diſeas'd with a Cough, I began with the opening of the Tumour, deſigning to do it by Cauſtick: But in Conſideration of the Prognoſtick which had been deliver'd of it, I made an Apertion with a Lancet, and paſſing in a *Cannula*, diſ-charg'd a Spoonful or two of a purulent Matter, which confirming my Judgment of a Tumour, I ſtop'd it up with a Tent, ap-plied a Cauſtick the whole Length of it, the next Day divided the Eſcar, and gave Vent firſt to a purulent Matter, then to an albugineous Humour. I dreſs'd the Ulcer with Doſſils fill'd with *Mundif. Paracelſi*, and the external Eſcar with *Baſilicon* and *Ol. Lumbricorum*. After Deterſion the Ulcer fill'd up with an *Hyperſarcoſis*, as all *ſtru-mous Ulcers* are apt, and ſo render our La-bour vain: Therefore, timely to prevent it, I dreſs'd it with *Precipitate*, and kept the Orifice dilated with Doſſils. While I was thus eradicating the *Struma*, I repeated the former Method of Phyſick, and heal'd the ſeveral Ulcerations about the Head, Face and Lips. All Things thus ſucceeding well, the Mother return'd into the Country with her Child, unknown to me, ſuppoſing it cur'd; but not taking Specificks with her to proſecute that Method there, it lan-guiſh'd and died, as I was afterwards in-form'd.

Obſervations of ſeveral ſtrumous Ulcers with Caries.

ONE about 13 Years of Age, grievouſly diſeas'd with the King's Evil, was com-mended to my Care. He had a *Struma* on the Right Side of his Neck, moveable, and of a round Figure. He had alſo a *Struma* ulcerated on each Arm; the one on the In-ſide near the Elbow Joint, and the other on the Outſide of the *Biceps*. His Right Hand

was

was ulcerated near the Bone, leading on the firſt Joint of the Thumb, and paſs'd its Matter cloſe by the Bone to the Inſide, corrupting the Bone. One of his Ankles was much ſwell'd and ulcerated on the Inſide in ſeveral Places, which Ulcers, upon Search with a Probe, appear'd to have Communication with one another, and ſerv'd for the Diſcharge of an Abſceſs lying in the Joint, with Corruption of the Bone. He had alſo in the Groin of the ſame Side a Cluſter of *Strumæ*, which (I ſuppoſe) were occaſion'd by the Anguiſh of the Ankle. Sir *Alexander Fraſier* and Sir *Fr. Prujean* were his Phyſicians, and preſcrib'd him Medicated Broths, Traumatick Decoctions, with other Specificks proper in his weak Condition. I began my Work with laying open thoſe Ulcers in his Hand and Ankle by Cauſtick, and proceeded by Deterſives to conſume the *Hyperſarcoſis*, and made Way to the Bones: After which, I dreſs'd them with Doſſils preſs'd out of Spirit of Wine, keeping thoſe Ulcers dilated: During which, I endeavour'd to digeſt the ulcerated Parts about, and cicatrize them to the carious Bones; likewiſe to cheriſh the native Heat in the Members, and defend them from Fluxion by good Diſcutient and Corroborative Fomentations and Bandage. By this Means the Matter daily leſſen'd, and the Patient recruited his Strength. I attempted the Exfoliation of theſe Bones ſome Days by dreſſing them with a Solution of *Unguent. Ægyptiacum*, Spirit of Wine, Powder of Myrrh, and *Euphorbium*, *&c.* upon hot Doſſils, and it ſucceeded well to that *Caries* on the Hand. But the Corruption was too great in the Ankle Joint to yield to the Medicament; wherefore having heal'd that Ulcer to the C I apply'd an actual Cautery through a *nula*. At the firſt Application, preſſing on the *Caries*, the Matter ſpurted out u us. I pull'd out the Cautery and *Can* and dried the Ulcer with arm'd Probes, peating the Uſe of the Cauteries till I conſum'd the *Caries*, then dreſs'd it up Lenients to appeaſe the Heat. After two three Days I dreſs'd the Bone with Do preſs'd out of Spirit of Wine, and the of the Ulcer with the white Ointment c phorated, and attended the Exfoliati during which, I laid open thoſe Ulcer his Arms by Cauſticks, eradicated the S *mæ* with Precipitate, and cicatriz'd them alſo cut out the *Struma* under the Jaw, ſoon heal'd it. The Ulcer on the leading to the Thumb was a painful W the Tendon lying over the *Caries*, which me at laſt upon the laying open the U on the Inſide, and applying my Medic that Way, by which I exfoliated the B more eaſily, and cured the former Open the while, and this ſoon after. The C in the Ankle was ſlower in the Exfoliati and did not caſt off its Shell till I touch it with Oil of Vitriol; after which, it ſoo exfoliated, and the Ulcer cured. The T mour in the Groin was embrocated wit *Valencia Digitalis* during the Cure, but did not reſolve till afterwards. The Cure o this Perſon was the Work of a Year, and was ſo doubtful for ſome Time, that it wa difficult to determine which ſhould be dif-member'd firſt, Hand or Foot. But he happily enjoys the Uſe of both, with a perfect good Health, to this Day.

Of the Ophthalmia Strumoſa, Fiſtula Lachrymalis, Tonſillæ, &c. *From Mr.* Wiſeman.

SORE Eyes are frequently a *Species* of the *King's Evil*, and take their Beginning from vicious Humours inflaming the *Tunica adnata*, which encreaſing, doth alſo ſometimes affect the other Tunicles, as the *Cornea*, *&c.* with great Pain, Tenſion, Pulſation, *&c.* whence *Puſtules* ariſe and ſuppurate, terminating for the moſt part in Ulcers, which have hard Cicatrizes, and by reaſon of the Defluxion falling upon the Edges of the Eye-lids, do make a Blearedneſs; upon which Account theſe Inflammations are generally call'd *Lippitudo* by the *Latins*. This differeth from the common *Ophthalmia*, in that it is periodical, and accompany'd either with ſtrumous Swellings in the Neck, a thick chop'd upper Lip, *Ozæna*, or ſome other Accidents.

The Cauſes are the ſame with thoſe of the *King's Evil*, yet it may be more particularly imputed to Abundance of Humidity repleting the Head, and deſcending to the weak Eyes. The Signs of *Ophthalmia* are apparent by what I have already deliver'd of the Diſeaſe. The *Ophthalmia Strumoſa* is moſt difficult of Cure, and in Children very vexatious, by reaſon of the Humidity they abound with; alſo becauſe of their Frowardneſs, and Incapacity of taking proper Remedies, or admitting external Applications; and in Conſideration of the Laxity of their Eyes, they are ſubject to relapſe of every little Diſorder. Thoſe ariſing from the internal Parts, as the *Dura Mater*, *&c.* are incident to more grievous Symptoms than thoſe which proceed from the *Pericranium*, and other external Parts. If in an *Ophthalmia* the Pain continue any long Time, there is Danger that the Tunicles of the Eye may be corroded; and if the *Cornea* happen to have been long ulcerated, a Blindneſs ſolloweth, or at leaſt a Dimneſs of Sight, by reaſon of a Condenſation of a groſs Matter about the Pupil.

In order to the Cure, their Diet ought to be of eaſy Digeſtion, with great Moderation, avoiding all ſharp, ſalt, hot or ſpicy Meats, and ſuch as may beget Crudities. The Air ought to be pure and temperate, Exerciſe of all Kinds prohibited, and Reſt enjoin'd; for Sleep is in theſe Caſes neceſſary, the Eyes enjoying Quiet, which mightily conduces to their Recovery. Their Bodies ought to be kept ſoluble by Clyſters and lenitive Purges, ſtrong Cathartick not being approv'd of in Diſeaſes of the Eyes. All the Teſtaceous Powders preſcrib'd in the general Cure of *Strumæ's* are here of Uſe; likewiſe Calomel, white Precipitate, Bezoar, Mineral, Antimony, Diaphoretick, *&c.* taking ſpecial Care to purge off Mercurials with Infuſion of Rubarb, Syrup of Succory, with Rubarb, *&c.* In the declining of the *Ophthalmia*, and indeed after general Evacuation and Diverſion of the Humours, you will find bathing the Body of great Advantage to contemperate hot and ſharp Humours.

Derivation is neceſſary in this Diſeaſe, and if there be Inflammations, or Blood abound, they may be bled in the Arm, Neck, *&c.* otherwiſe by Leeches behind the Ears. Shaving the Head, Bliſtering, Cupping, Fontanels, and Setons, are of frequent Uſe; but Fontanels made in the Neck do often occaſion ſtrumous Swellings to ariſe thereabouts. In Application of external Remedies to the Eyes, we ought not to be over forward; for the mildeſt Medicaments dropped into them prove generally offenſive in the Beginning of the Inflammation. Beſides, we ſee in our daily Practice, that the

leſs Diſturbances of them go off by general Evacuation and Derivation, and that thoſe Eyes have fared worſt which have been moſt treated by Topicks: But if the *Ophthalmia* be not attended with grievous Pain, you ſhall then conſider, whether the Diſeaſe be in its beginning State, or Declination, and proceed accordingly. For let the Empiricks boaſt of this or that Collyry, they cannot cure theſe *Ophthalmia* with any one particular Medicine: For in the Beginning, they require Repellents; and in the Increaſe, ſomewhat of Reſolvents and Deterſives of a drying Quality.

We begin with Repellents, of which Sort the ſtrongeſt are the Whites of *new laid Eggs* beaten to a Froth, with a Piece of Allum. Or in the Beginning, uſe *Rhaſis*, *white Troches*, and *Bole Armen.* in Roſe-water or Breaſt Milk: Or elſe, a Cataplaſm of Pulp of Quince or Apples, made in Plantane Water, Sumach, Balauſtians, with Barley Flower, and Juice of Houſeleek. After this, with ſome of the cooling Waters afore-mention'd, accordingly as the Diſeaſe indicates, we add Diſcutients to the Repellents; as Stœches and Elder Flowers boil'd in Plantane Water for a *Fotus*, to three Ounces of which add Sarcocol, one Dram; Tutty prepar'd, half a Dram; mix them well in a Marble Mortar.

In the Increaſe of the Diſeaſe, Authors generally apply Reſolvents; as Linſeed, Fœnugreek, *Althea*, Melilot, and Camomil, *&c.* boil'd in Water, and apply'd warm with Stupes. The Collyry may be a Solution of Frankincenſe, Sarcocol, white Sugar, Tutty, *&c.* in the preceding Decoction. To prevent the gumming of the Eye-lids, cut a Piece of Sponge fit to cover the Eye, and at Night when the Patient is in Bed, dip it in Vervain, Eyebright, or Roſe-water, and lay it wet upon the Eye, the warmer the better, ſo it do not ſcald. This will keep the Eye cool, and ſuck up the Moiſture. In the Declination, Take, Tutty prepar'd, waſh'd Aloes, white Sugar; infuſe them in Eyebright or Rue Water: Or Take, white Vitriol, Tutty and Camphire, in Roſe-water. In caſe the Tunicles of the Eyes grow too dry, moiſten them with a Fomentation of Endive, Lettice, Nightſhade and Violet Leaves; after the Uſe whereof, waſh t next Morning with Breaſt Milk.

Theſe Inflammations of the Eyes are g nerally attended with a *Lippitudo*, and call'd ſo by the *Latins*; but that whic mean here, is a Bleareдneſs of the Edges the Eye-lids, of which there are two Sor the *Humida* and *Sicca*, which are both t Effects of great Defluxions, excoriating t Lids, and relaxing the Tone of them. T *Humida* is more remarkable upon Accide of burning by Fire, Gunpowder, or the lik but that which I ſhall here ſpeak of, i *Lippitudo* with an *Hyperſarcoſis*, which ariſe upon the excoriated Lid, and turneth outward, being always accompany'd wi Fluxion of the Eye. The *Lippitudo Sicca* an Excoriation of the Lid, but ariſeth fro a ſalt Flegm mix'd with a bilious Humour and lieth upon the *Cilia* amongſt the Ha with a brawny white Scale, not much u like an *Elephantiaſis*, and is attended with a Itching.

The *Ægilops* is a Tubercle in the inn *Canthus* of the Eye, either *ſcrophulous*, *atheromatous*, or of the Nature of a *Meliceris*, o ſometimes with Inflammation. It ha two Names, *viz.* *Anchylops*, when it is no ulcerated; *Ægilops*, when it is; in whic latter Caſe it is very apt to grow ſinuou and being ſo, whether it prove callous o not, is however call'd *Fiſtula Lachrymalis*, ſometimes paſſing through the Bone of t Noſe it ſelf. If it be *Struma*, *Atheroma*, *&c.* it is then made by Congeſtion, and the T bercle is round, without diſcolouring t Skin. If it be made by Fluxion, Pain an Redneſs do appear, with Inflammation ov all the Eye. Sometimes it begins only wi a weeping of that Corner, and is not diſco ver'd till it affects the Eye with Redne and then by Preſſure with your Finger u on that *Canthus*, mix'd Matter may be di charg'd, Part whereof is not unlike t White of an Egg. Sometimes this Matte eateth quite through the Bone, and diſcha ges it ſelf thence with a fœtid Smell.

Fiſtulæ Lachrymales are difficult of Cu from what Cauſe ſoever they ariſe, the Pa being looſe and ſpongy, the Eye very ſe ſible, and the Laxity of the Part make Humours apt to ſoak into it, and to pen

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trate even to the Bone it ſelf. The Senſibleneſs of the Eye renders it ſubject to Pain and Fluxion, as alſo unfit to be dreſs'd with ſharp Medicines, ſuch as theſe Diſeaſes require. That *Fiſtula* which is recent, with ſufficient Opening, is the eaſieſt of Cure: Thoſe of long Continuance, attended with Ulcerations of the Gland, and *Caries* in the Bone, make them ſubject to a weeping after they are cur'd.

The Indication of Cure is taken from the Condition of the *Ægilops*, in the Beginning of which Bleeding is neceſſary, and ſo is Purging; alſo ſuch Alteratives as have been preſcrib'd in the general Cure of *Strumæ's*, with Regulation of Diet accordingly. Externally we apply Repellents to the diſeas'd Part, to prevent Fluxion, of Purſlane, Lettice, Plantane, Horſe-tail, Nightſhade, Frog-Spawn, *&c.* with Whites of Eggs, and Bole Armen. To intercept the Matter, we apply Gum Maſtick, *Tacamahaca*, *Empl. ad Herniam*, to the Temples, and Parts about. If the Tumour increaſe with Tenſion and Pain, it will be then reaſonable to endeavour Diſcuſſion by Medicaments already deſcrib'd in the *Ophthalmia*. In the *Anchylops*, rancid Nuts beaten and applied are much commended, ſo likewiſe Quick-lime mix'd with Honey. If the Tumour tend to Suppuration, then haſten Concoction with Lilly Roots, Marſhmallow Seeds, Fenugreek, Linſeed, Wheat Flower, Hogs Greaſe, *&c.* The Matter being well concocted, lay it open large, that you may have Way to apply your Medicines. Authors have propos'd various Eſcroticks to open theſe; but I uſe the opening of them by Knife or Cauſtick. The only Caution is, that you open it ſuch a Diſtance off from the Edge of the Eye-lid, that you divide not that; for in ſo doing, you will leave a remedileſs Blemiſh, and the Eye will be apt to water ever after, and be ſubject to Fluxion: Therefore if you open it by Cauſtick, it will require your greater Care. I for the moſt part open them by Inciſion, then digeſt them in a Doſſil dip'd in Oil of Roſes and the White of an Egg; over which apply *Galen*'s Cerate, or ſuch like Anodines, with a Compreſs dip'd in ſome of the aboveſaid diſtilled Waters, to contemperate the Heat in the Part, and afterwards deterge with Honey of Roſes, *&c.*

If it be Fiſtulous, and the Orifice ſmall, dilate it with Gentian Roots, or ſuch like, and proceed with Deterſives, as hath been ſaid. If thereby the *Callus* do not waſte, you may inject this following Decoction: Take, Rue, Celandine, Agrimony, of each half a Handful; infuſe them all Night in half a Pint of Spirit of Wine, ſtrain them for Uſe, and apply the following upon Doſſils. Take, Ginger, two Drams; Verdigreaſe, two Scruples; Honey of Roſes, three Ounces; good Vinegar, four; boil them to a Conſiſtence. If there be a *Caries*, apply this: Take, burnt Vitriol, *Cantharides*, the Heads and Wings being taken off, Quick-lime, *Sal* Armoniack, Roch Allum, of each equal Parts, inſpiſſated with the Urine of a Boy. Theſe are the Medicines propos'd by Authors of good Authority. In the applying them, the Parts muſt be well defended, and the Fluxion reſtrain'd by the Application of Refrigerants; and after all it is a moſt painful tedious Way: Therefore I propoſe the Uſe of the actual Cautery, which being applied through a *Cannula*, will with one Touch waſte the Calloſity and *Caries*: After which, dreſs it up with a Doſſil dip'd in a Mixture of Oil of Roſes with the White of an Egg, and a Compreſs in the ſame over all; then digeſt and deterge with the milder Preſcriptions, keeping the Orifice dilated with a Doſſil dip'd in Tincture of Myrrh, *&c.* till the Bone exfoliate, then with Ointment of Tutty, *&c.* with Compreſſion cicatrize.

The *Tonſils* or Almonds of the Ear are alſo frequently ſwell'd in the King's Evil, which Tumour may be very well reckon'd a *Species* of it. Theſe Swellings are rais'd by Congeſtion gradually without Pain, and therefore are ſeldom taken Notice of, till by their Growth they bring Inconveniencies with them, as Catarrhs, Coughs, and Difficulty of Swallowing; in which latter Caſe their Drink often runneth out at the Noſe. Theſe differ from the common Swellings of the *Almonds*, as Tumours by Congeſtion do from thoſe made by Fluxion, which latter are of ſudden Growth, and terminate as ſoon; whereas the other may have been many Years growing, and do increaſe and decreaſe with the Moon, as generally all Tumours by Congeſtion in the Glands do.

The Cauſes of the Tumefaction of theſe Glands are the ſame with thoſe of *Strumæ's.* They are ſoft fleſhy Tumours, of a round or oval Figure, retaining the natural Colour of the Skin, and are of an obtuſe Senſe, ſo that you may pierce the Body of them with a Knife or Probe without cauſing Pain or drawing Blood, yet are they ſubject to Inflammation, and the like Accidents that other Swellings of the Glands are. If the Tumefaction be ſmall, the Diſturbance is little, many People having had them from their Infancy without great Inconvenience. If the Swellings be big, there may be Danger of Suffocation; but in that Caſe they may be extirpated without running any great Hazard.

In order to the Cure, Phyſicians generally preſcribe Veneſection, and by Clyſters and lenitive Purgations make Evacuation; alſo by Bliſtering, Cupping, Fontanels, *&c.* They endeavour Derivation, which is neceſſary in caſe of Inflammation, in wh . aſtringent Lotions may be alſo proper: For in thoſe made by Congeſtion, the ſpeedieſt Way of Cure is by Extirpation, and that either by Abſciſſion, at once cutting them off, or by actual or potential Cautery. Modern Authors have ſaid little of theſe Extirpations. *Fabricius ab Aquapendente* in his Book *de Operat. Chirurg.* renders the Abſciſſion of them difficult enough, and not without Danger, as you may ſee, where delivering *Celſus* and *Paulus*'s Way of cutting them out, he determines at laſt thus: *Ex quibus licet colligere, neque facilem, neque omnino tutam hanc Chirurgiam eſſe, &c.* The firſt Surgeon in my Memory that attempted the extirpating them, was the late excellent Operator Mr. *Edw. Molin* deceaſed. He attempted it upon a Perſon of Honour by actual Cautery through a *Cannula* well contriv'd for that Purpoſe. I afterwards ſaw him burn ſeveral. He paſs'd the Cautery through the Body of them, and by repeating of it twice or thrice, he burnt a Hole thro' them, and accordingly crimpled them up, as may be yet ſeen in that noble Perſon, ſomewhat of the Excreſcence ſtill remaining, and not without ſome Uneaſineſs at certain Times; upon which Account I had the Honour to ſee it ſome Years ſince. The Way by potential Cautery is, by working with a Cauſtick Stone, and other Eſc ticks, fix'd in ſuch an Inſtrument as ſ ſerve to eat into them without offending neighbouring ſound Parts; to which P poſe I make my Way into the Body of Gland, conſuming it within, and at the Shell, or exterior Parts, falls in Pie and is ſo radicated. The Way by Excil is, by making a Ligature about the Baſis them, and ſnipping of them cloſe off w a Pair of crooked Probe Sciſſars. In t Work, you ought to conſider well how th are radicated: For ſometimes they are roo like a *Criſta*, deeper in the Throat, in whi if in cutting them you only cut that P you tied, and cut the Ligature at the ſa Time, it will ſlip down into the Thro and hazard their choaking: Therefore whi you hold the Ligature with one Hand, you muſt paſs the Sciſſars down as cloſe by th Baſis of it as you can, ſo as by one Snip you may cut it clear off. But leſt you ſhould fail, it will be neceſſary to have another Ligature fitted in an Inſtrument for your Purpoſe, and the Patient's Head to be held ſteady, that in caſe you fail in the firſt Attempt, and it fall into the Throat, you may readily return it, and tie it at the ſame Time, which is no difficult Thing to do. The Exciſion made, the Bleeding will ſoon be ſtop'd by gargling with Oxycrate, and you may cicatrize it in a few Days by touching it with the Vitriol and Allum Stones.

A *Ranula* is a ſoft Swelling poſſeſſing the Salivatory Ducts under the Tongue. It is made by Congeſtion, and in its Progreſs filleth up the Space between the Jaws, and maketh a Tumour externally under the Chin. It is caus'd, ſay Authors, by a pituitous Matter *e Cerebro in Linguam prolapſa*: But late Diſcovery hath made it manifeſt to arise from a Congeſtion of Humour in the interior Salival Gland, which is ſeated there, as I have already intimated. It is a ſoft Tumour, without Pain, or Alteration of Colour in the Skin. It yieldeth to the Impreſſion of your Fingers, but riſeth upon the taking them off, and containeth a Matter not unlike the White of an Egg, or ſuch as we meet with in an *Atheroma.* It is also diſcover'd by a croaking in their Speech. They are not dangerous as to Life, but a diffi-

ficult of Cure, which conſiſteth in the proſecuting the ſame Method which hath been propos'd in the Cure of the *Struma*. The Topicks ought to be diſcutient, amongſt which all the Sorts of Salts and Aromaticks diſſolv'd in convenient Liquors are proper to hold in their Mouths, *viz.* Pepper, Ginger, of each a Dram; Sal-Gem, and common Salt, of each two Scruples; *Origanum*, Calamint, Orrice and Hermodactil Roots, of each half a Dram; Maſtick, a Scruple; mix theſe, and boil them in Wine or Oxymel. Or the Tumour may be rub'd with the Powder. To the external Tumour you may apply ſuch Diſcutients as have been preſcrib'd for *Struma's*. If by theſe Applications the *Ranula* do not diſcuſs, you muſt open it by actual Cautery, and dreſs it as hath been ſhewn already.

Of the Scirrhus *and* Cancer: *From Mr.* St. Hilaire. *And particularly of* Cancers: *From Meſſieurs* Gendron, Alliot, Helvetius, *&c. Together with a Manuſcript Copy of* Fuchius *in the Hands of one of the Compilers of this Work, wherein it will appear, Meſſieurs* Gendron *and* Alliot's *Notion of* Cancers, *and Method of Cure, were known long ago. Likewiſe Mr.* Dion's *Operation practis'd on the* Cancer: *With new Diſcoveries relating to the Cure of* Cancers, *&c. From* William Beckett, *Surgeon.*

THE *Scirrhus*, according to Mr. *St. Hilaire*, is a hard Tumour, reſiſting the Touch, immoveable, without either Pain or Heat, which is generated gradually by little and little, and occupies not only the glandulous, but alſo the fleſhy Parts, both external and internal, as the *Viſcera*, *&c.*

This Tumour, according to *Etmuller*, proceeds from a Coagulation of the pure Blood; for a *Scirrhus* will often ſucceed an Inflammation if ill cur'd or manag'd, eſpecially by Repercutients and Aſtringents: Or elſe from the Chyle, which, when crude and viſcous, and being diſpers'd together with the Blood, or with ſome other foreign Vehicle, is coagulated, and occaſions a hard Tumour; whence it is, that an œdematous Tumour will ſometimes degenerate into a *Scirrhus*. The Swellings that happen ſo frequently in Women's Breaſts, may alſo not improperly be refer'd to this Head, by reaſon of the Milk which is often turn'd into a *Scirrhus* or ſcrophulous Tumour: For the Blood and the viſcous Chyle being mix'd together, do gather and coagulate as they paſs ſucceſſively through the Pores of the Parts, and more eſpecially through thoſe of the *Viſcera*, where being ſtop'd or detain'd, they degenerate into ſcirrhous Tumours by Means of an Acid *contra Naturam*, which is there either in too great a Quantity, or elſe too auſtere, or too much fix'd, or vitiated in ſome other Reſpect.

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The Signs of a true or legitimate *Scirrhus*, are Hardneſs and Indolency, which always accompany it; as Pain and a livid Colour are Signs of a falſe or ſpurious *Scirrhus*, which in ſome Meaſure approaches to the Nature of a *Cancer*. A *Scirrhus* muſt of Neceſſity be hard, becauſe it is produc'd by the Blood and *Lympha*, which is more concreted here than in the œdematous Tumours. It is without Pain, becauſe the ſaline Particles being enclos'd within the terreſtrial ſulphureous Parts, are diſabled to act upon the nervous Fibres. A *Scirrhus* is difficult to be cured by reaſon of its Hardneſs, which we muſt endeavour to allay by Emollients and Diſcutients if it be poſſible. If there be no Senſation in the *Scirrhus*, there is no Hopes of Cure; whereas on the contrary, if there is ſomething of Senſation left, there may be Hopes of a Cure, it being a certain Sign that the Obſtruction has not as yet ſeiz'd upon all the *Tubuli*, but that many of them are left open ſtill to give a Paſſage to the Juices and the Spirits.

A *Scirrhus* is incurable in weak, lean and aged People, who will be ſure to carry it with them to their Graves. A *ſcirrhous Tumour* frequently terminates in a *Cancer*, by reaſon of the great Quantity of corroſive Acids which are in the Blood; and the ſame Thing happens likewiſe ſometimes from the prepoſterous Applications of Emollients and Reſolutives. In caſe a *Scirrhus* goes into a Suppuration, you muſt expect nothing leſs than a *Cancer*, and an incurable *Fiſtula*.

A *Cancer* is a peculiar Tumour, and the only one of its Kind. In the Beginning it is ſcarce of the Bigneſs of a Pea or Bean; but in Proceſs of Time, ſometimes ſooner, ſometimes later, it increaſes to a conſiderable Size. At firſt, whilſt it is yet ſmall, it makes its Appearance like a hard blackiſh, and ſometimes livid, Tumour, which is very troubleſome by its pricking Pain; but as it increaſes in Bigneſs, the Tumour is not only hard, but alſo turns livid, or of a Lead Colour, attended with Pain, which at firſt is ſomething tolerable, but in its Augmentation becomes inſupportable; and when it goes into an Exulceration, the Pain increaſes to ſuch a Pitch, that it ſeems as if you were prick'd with Needles, or elſe that your fleſhy Parts all about were corro with *Aqua fortis*, *&c.* for it will eat the neighbouring Parts, and is atter with Corruption, and a very ill Scent proceeds from the putrid Ulcer.

When the *Cancer* is in its Augmenta and ready to come to an Exulceration, t is an exceſſive Heat, a troubleſome prick Pulſation, the circumjacent Veins are ſwe and repleniſh'd with very black Blood, the Branches divaricated like the Claw a Craw-Fiſh, till the cancerous Tumour generating into an Ulcer, makes the p Patient die a moſt tormenting Death, un leſs you prevent it, and extirpate the *Can* either by the Help of the Iron, or the F A *Cancer* ſeldom comes of it ſelf, unleſ be in the Breaſts, but moſt commonly ſu ceeds other Tumours, when they are ill ma nag'd, or not well cur'd. The Breaſts are more ſubject to a *Cancer* than the other Part and next to the Breaſts the glandulous Part And it is upon that Account that the Ul cers in thoſe Places are the more dangerou as participating of the Malignity of a *Can cer*. The external Parts of the Face, as the Mouth, the Noſe, and the Lips, are nea to the glandulous Parts ſubject alſo to a *Can cer*, which grows like a *Cancer*, and is call'd the *Noli me tangere*, or the *Lupus*.

When ſome external Hurt or Violence happens to light upon thoſe Parts; as for Inſtance, a Contuſion upon the Breaſt, it may give Birth to a *Cancer*. Its malignant Ferment may lie dormant there for a conſiderable Time, till it makes its Appearance at the Time of its Maturity, and is augmented afterwards by the Acceſſion of ſome internal Cauſes, and more eſpecially by the Menſtrual and Hemorrhoidal Suppreſſion. The true Cauſe and Origine of a *Cancer* muſt, according to *Etmuller*, be aſcrib'd to a volatile Acid, which is extremely corroſive, and participating of the Nature of an *Arſnick*. *Hildanus* has moſt ingeniouſly diſcover'd two Sorts of venemous Qualities in a *Cancer*, *viz.* the corroſive, and the putrefying. This Acid lies dormant in the Beginning of a *Cancer*, as alſo in its Augmentation, and before it comes to an Exulceration. But when once the cancerous Ulcer makes its Appearance, it is then that it quickly manifeſts it ſelf by its moſt dread-

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Symptoms. The Reaſon why it lies ſo conceal'd is, becauſe it is not furniſh'd with a freſh Supply of Acids, or elſe becauſe is not irritated by any external Means, which may put it into Motion; for if by the leaſt Irritation it is rais'd into an Efferveſcency, the malignant Ferment will take its full Career, and expanding it ſelf into a much larger Space, produces a *cancerous Ulcer*, or an *exulcerated Cancer*: And hence it is that ſo long as the *Cancer* is not come to Exulceration, it is call'd a hidden *Cancer*; but when it is once exulcerated, it is call'd an open *Cancer*.

The Signs which foretel that an *occult Cancer* is near breaking out, or being open'd by Exulceration, are, exceſſive Pain and Pulſation, which prove more pricking and painful than before. The Heat and Tumour increaſe alſo, till at laſt the Ulcer makes its Appearance. However, the Pain is without Compariſon much greater in an exulcerated *Cancer* than before, becauſe the acid, acrious and vitriolick, with the volatile alkaline Particles, which ferment together, do make moſt violently, and cauſe a Diſruption in the nervous Fibres: And it is eaſy to conceive, that nothing is more adapted to produce exceſſive Pains, than ſuch-like long pointed and double ſharp-edg'd Particles, like a Lancet Blade; for ſuch is the Matter of the *Cancer* which enters into Efferveſcency, the Figures whereof very near reſemble thoſe of *Aqua fortis*. The Stink or ill Scent which proceeds from an exulcerated *Cancer*, ſhows, that it can owe its Origine to nothing elſe but the Exaltation of the oleaginous ſulphureous Parts, which have diſtill'd themſelves from the other more groſs Principles.

A *Cancer* will lie dormant ſometimes for many Years, becauſe the hard *Lympha* that cauſes it is very thick, and therefore the corroſive Salts may remain incloſ'd within it for a long Time; but when theſe Salts once come to be diſentangled by Fermentation, the *Cancer*, which hitherto was nothing elſe but a ſmall Protuberancy, ſoon after, as it were a ſudden Eruption, makes its full Appearance all at once, in the Shape of a large, round, unequal and livid Tumour, with the Veſſels inflated all round about it, which repreſenting in their Shape the Claws of a Crab, has given the Name of *Cancer* to this Tumour. It is always attended with exceſſive Pain, becauſe the acrious Salts, being once diſengag'd, fail not to exert their Vigour by pricking the nervous Fibres. The Matter that iſſues from an exulcerated *Cancer* is not always of the ſame Conſiſtency; for ſometimes it is thin and white, and at other times thick, which Variety can be aſcrib'd to nothing elſe but the Mixture of the Liquors, and the different Structure of the glandulous Veſſels. The lingring Fever which accompanies the *Cancer*, derives it ſelf from the Salts, which being diſſolv'd in the *Lympha*, are afterwards carry'd into the Blood, and raiſe there a Fermentation. The Part which is afflicted with the *Cancer* is livid, or of an Aſh Colour, which Colour is produc'd by the nutritious Juice coagulated by the Acids even in the moſt minute Capillaries of the Glands, and of the Skin, ſo that the Texture of the Part becoming more porous than before, and conſequently the Light which falls upon it not meeting with the ſame Superficies, a black or livid Colour muſt needs be the Reſult of this Alteration.

The Calloſity and Induration which are obſerv'd on the Edges of the *Cancer*, derive their Cauſe from nothing elſe but the Obſtructions occaſion'd by the acrious Salts, which are fix'd within the Pores of the fleſhy Parts. There is not a more vexatious Diſeaſe under the Sun, and which gives more Uneaſineſs to a Patient, than an exulcerated *Cancer*; neither is there any other Diſtemper that gives ſo much Trouble to a Surgeon, becauſe it is moſt commonly incurable. 'Tis upon this Account that *Hippocrates* adviſes us not to meddle with a hidden or latent *Cancer*; for (ſays he) if you meddle with it, you only aggravate the Evil, and haſten the Death of your Patient: For whenever you attempt the Cure of ſuch a *Cancer* by the Application of certain Remedies, you moſt commonly put the acrid *Lympha* in Agitation; whereupon the Salts diſengaging themſelves, make a moſt miſerable Havock in the Part where before they were fetter'd or lock'd faſt. All the *Cancers* of the Womb, Inteſtines, Eyes, and of the

Palate

Palate alſo, are incurable; whereas on the contrary, thoſe of the exterior Parts, as in the Breaſts, *&c.* do admit ſometimes of a Cure, either by Means of a total Extirpation, or by ſuch internal Medicines as proper to ſweeten and deſtroy the corſive Acrimony of the infected Juices.

Of the Cancer, *and its Operation. From* Dion, Gendron, Alliot, Helvetius, Fuchius, *&c.*

A *Cancer* is univerſally agreed to be the moſt terrible of the Evils which attack Mankind; for tho' War and Plague kill in leſs Time, they don't ſeem ſo cruel as the *Cancer*, which as certainly, though more ſlowly, carries thoſe afflicted with it to the Grave, withal cauſing ſuch Pains as make them every Day wiſh for Death. 'Tis a Diſeaſe which attacks not only the Breaſt, but ſeveral other Parts, on which it is not leſs outragious. It ſometimes aſſumes different Names; as, on the Leg, a *Wolf*; on the Face, *Noli me tangere.*

To come to the perfect Knowledge of the *Cancer*, we muſt examine it, 1. When it is no more than an Impoſtume; 2. When it is degenerated to an Ulcer. The *impoſtumated Cancer* is originally a ſmall round flat Tumour, of the Figure of a Lentile, and ſometimes continues long without increaſing. At its Riſe, 'tis often free from Pain; then augmenting by ſlow Degrees, 'tis attended with Pain, which increaſes in Proportion to the Growth of the Tumour, till it becomes inſupportable, not by reaſon of its great Violence, but being ſtupid and tireſome, it afflicts the Patient Day and Night, not allowing him any Repoſe. When the *Cancer* is grown big, the Tumour is hard, ſcirrhous, rough, livid and painful, very adheſive by reaſon of its numerous Roots, and remarkable on account of the Veins of black Blood diſpers'd over its whole Superficies. In the firſt Days of the Ulceration of the *Cancer*, it looks like a raw flay'd Place, from whence there exhales a ſharp Seroſity, which afterwards becomes corroſive, and eating the Tumour, it makes an Orifice, which is defin'd to be an apparent, round, loathſome and ſtinking Ulcer, with large, hard, knotty and revers'd Lips, of a livid or dark Colour, and ſurrounded with Veins fill'd with Melancholy Blood.

The Cauſes of *Cancers*, according to ſome, are both external and internal. The firſt refer themſelves to a violent Contuſion, or rather Compreſſion, as it moſt commonly happens to the Glands of Women's Breaſts, which makes Room for the *Lympha* to ſtay there, to thicken, and acquire an Acrimony by its Continuance. The principal of the internal Cauſes is, in the vitiated Temperament of the Liquors being ſeparated from a terreſtrial and viſcous Blood, wholly fill'd with coagulating Acids, which forming Obſtructions in the Glands, detain the *Lympha* there, and diſpoſe it to ſuch a Degree of Acrimony, as to putrefy the glandulous Subſtance which contains it.

A *Cancer* on the Breaſt is known by the Tumour of the Part, which ſeems rough and unequal by reaſon of the Swelling of the Glands, which are grown hard, and choak'd with Humours. It is frequently adherent to the *Thorax*, the Veins of the *Mammæ* are viſible, and full of aduſt Blood; and when there is a Lividneſs on the Point of the Tumour, 'tis a Sign that 'twill ſoon ulcerate. When 'tis open, the Pain is incomparably augmented, becauſe the Seroſity which comes out is as biting and corroſive as *Aqua fortis*, and continually eating theſe Parts, does not allow the Patient any Relaxation. Of twenty Women afflicted with *Cancers*, fifteen will be found to be aged

aged from Forty five to Fifty Years, when Nature uſually puts a Stop to the Menſtrual Evacuations.

Some believe, that the ulcerated Cancer is nothing elſe but a prodigious multitude of ſmall Worms, which by little and little devour all the Fleſh of the Part. What made Room for this Opinion is, that with the Microſcope we have ſometimes diſcern'd ſome of thoſe Inſects in Cancers, and that putting a Bit of Veal on the Ulcer, the Patient has felt leſs Pain; becauſe, ſay they, theſe Worms then feeding on the Veal, leave the Patient at Reſt for ſome Time: But within theſe latter Years Three eminent Phyſicians have written very differently on this Diſeaſe; One is Monſieur *Gendron*, Doctor of Phyſick of the Faculty of *Montpellier*, Nephew to the Abbot *Gendron*, who dreſs'd the Queen, Mother of the King, that had a Cancer in her Breaſt. The Second is Monſieur *Alliot*, Counſellor and Phyſician to the King, and the *Baſtile*, Son of Monſieur *Alliot*, Phyſician at *Bar le Duc*, who was ſent for, and came to Court in 1666, to dreſs the ſame Queen of that Diſtemper; and the Third is Doctor *Helvetius*, who is very well known at *Paris* by the Name of the *Dutch* Phyſician. Theſe Authors have form'd particular Idea's of the Nature of the Cancer, and have each of them ſet up a different Syſtem, upon which we are to embrace that which ſeems moſt probable.

Monſieur *Gendron* ſays, That the *Cancer* is a Transformation of the nervous glandulous Parts, and the Lymphatick Veſſels, into one uniform Subſtance, which is hard, compact, indiſſoluble, capable of Augmentation and Ulceration; and he further adds, that he acknowledges no other Cauſe of this Transformation, than the Ceſſation of the Filtration of the Part, which by the Loſs of its Spring, and enfeebling of its Tubes, becomes one Subſtance, capable of encreaſing by a mechanical Diſpoſition of the contiguous Parts, which render it irreducible to its firſt Eſtate; and he maintains, that the Ulceration depends only on the Incidents attach'd to the extream Augmentation of the tranſform'd Body, which by an actual Preſſure, or by the Alterations in the Blood, which occaſion the Lividneſs, cauſes the Rupture of the Skin, which is to the Cancer what the *Perioſteum* is to the Bones, and afterwards expoſes the cancerous Maſs to the Impreſſions of the Air, in the Circumſtances of its Structure jetting further out; that is, in a State of Augmentation by its Roots, which have a Sort of Vegetation, enabling them to ſpread into their Neighbourhood, and a Conformation of Pores to corrupt the Humours by which they are imbib'd.

Monſieur *Alliot* ſays, That the *Cancer* is a very hard, ſometimes ſtony, rough and livid Tumour, always accompanied with Pains, more or leſs violent, according as the Circumſtances which meet in it are more or leſs uneaſy. He adds, That the Cancer generally taken is a ſcirrhous Tumour, ſince it is not only very hard, but painful; with this Difference, that the *Scirrhus* is indolent. He looks on the Redneſs, the Roughneſs, the Lividneſs, and the interſpers'd Veins, as equivocal and accidental Signs, and conſiders the Pain as the ſpecifick and individual Character of a *Cancer*. He affirms, that the melancholy Humour which forms the *Scirrhus*, is charged with an Acid much leſs open'd than in the *Cancer*, in which it does not come to the Degree of Corroſion till its ſharp cutting Points have ſurmounted and deſtroy'd, if we may ſo ſay, the Volatile Flegmatick and Balſamick Salt of the Blood, and then pricking and lacerating the nervous and membranous Parts by their irregular Motion, they excite at laſt horrible Pains, which are felt in the Cancer.

Monſieur *Helvetius* believes, that the Source and Origine of the *Cancer* is nothing elſe but a ſmall Coagulation of ſome Drop of Humour in a Gland; that this Coagulation proceeds commonly from an exterior Accident, as a Blow, a Fall, ſome Preſſure or Strain; that in Proportion to the Quantity of Humour which gathers in the Gland, the Cancer encreaſes; that in its growing the Pain augments, becauſe the nervous Fibres preſs'd by the Tumour make impulſive Efforts, more or leſs painful, according as the Preſſure is more or leſs violent; that the Diſeaſe is encreas'd by the Application of Remedies to it, becauſe they inflame it, and by that Means rouſe and ſharpen the Humour, which remains as it were doz'd all

the Time that it is not irritated by any Thing which may ſet it in Motion; that the Remedies, whether diſſolvent or abſorbing, which cauſe an Effervescence, alſo cauſes that the Leaven taking up more Room than before, produces terrible Pains, and that not being poſſible to be contain'd any longer in the Gland into which it was thrown, it burſts it, and forms another, which is called an open *Cancer*, whoſe Ferment afterwards diffuſes it ſelf into the neighbouring Parts.

Theſe Authors don't only diſagree about the Nature of the *Cancer*, but alſo about the Manner of treating it, they propoſe to us Three different Methods: Monſieur *Gendron* requires only the Palliative in the Cancer, and forbids Eradicatives in the Cure. Monſieur *Alliot* will have us conſume the cancerous Tumour with his abſolving Cauſtick, and Monſieur *Helvetius* orders the Extirpation of it by Operation. Now let us ſee on what they found their Opinions.

Monſieur *Gendron* propoſes the attempting of no more than the Palliative Cure in all Manner of *Cancers*, whether before or after Ulceration. He calls thoſe occult Cancers, whoſe cancerous Humour is adherent. He proves the Impoſſibility of Cure, by the deep Roots which they have ſpread into the internal Parts, and affirms, that nothing is then to be done but to offer the Patient the Help of Palliative Remedies, which in this Caſe are ſuch as retard as much as poſſible the ſucceſſive Diſorders attach'd to the Progreſs of theſe *Cancers*, having to that End Regard to the Situation of the Evil, its Cauſe, Age, Sex, and Temperament of the Patient, in which he advertiſes us, in order to ſucceed, 'tis of Importance to rid our ſelves of the Prejudice of the Exiſtence of a corroſive Acid, compar'd to *Aqua fortis* and *Arſenick*, leſt being perſuaded that all the Secret of the Palliative Cure barely conſiſts in the Uſe of ſome abſorbing Medicaments, Specificks againſt this ſuppoſed Acid, far from ſtopping the Progreſs of theſe Evils, ſhould prove the Cauſes of their Irritation. Laſtly, he does not at all aſcribe the Incurableneſs of occult as well as ulcerated *Cancers*, to the untractable Character of an acid Humour, but only to the Circumſtances attach'd to the Structure and to the Augmentation of the cancerous Subſtance. If theſe Ulcers are uncicatrizable, 'tis becauſe the Fibres of the Skin are not able to connect and unite with those of the new transform'd Maſs.

And here I doubt not but it will be acceptable to the Curious to inſert the Opinion and Practice of the learned *Fuchius* in his own Words; from whence we may learn this Notion of Monſieur *Gendron* was known in his Time, as well as Mr. *Alliot*'s Practice.

Experimentum Ant. Fuchii in Benedict. Calendarium, qui Cancro laborabat in Mammis, & curatus fuit.

Rs. *AUripigm. in Alcool. reduct. p. j. Miſce non Pondere, ſed Menſura Rad. Aron. Pulv. p.* jv. *Fuligin. Camin. parum miſceantur exacte, quo vetuſtior erit Pulvis, eo melior. Cancer varias habet Venas inſtar Radicum, quæ Sanguine Viſcido & tenaci turgent, ita ut illæ ſuis Radicibus tolli nunquam poſſint: Pulvis porro hic unica Vice Operationem ſuam exequetur, quippe durat donec omnia ſecum recipiat.*

Cum autem applicetur etiam Pulvis, nec removendus, nec ei ſuper imponenda Medicamenta, ſeu Anodina, ſeu Emollientia, quippe periculoſiſſimum eſſet Ægro: Sed undiq; circum circa Latitudine unius Digiti Defenſiva ſeu Repercutientia applicanda, ut Inflammatio cohibeatur, quippe dum Medicamentum ad Venas & Radices penetrat eaſq; reſcindit, fit Dolor magnus, non continuus, ſed tamen per Intervalla, cumque rumpuntur Radices, prodit magna Sanguinis Quantitas cum Aqua, & prodeunte Dolor ceſſat.

Hujuſq; Humoris Quantitas magna per unum aut alterum Diem exſtillat, tunc non removendum adhuc Medicamentum, ſed ei apponenda Linimenta, quæ ubi Humore imbuta ſunt removenda. Superveniente Tumore aut Inflammatione dimidio Digito circa Medicamentum applicetur defenſivum cum Bolo oleo roſato & aceto.

Dolor per Diem & Noctem erit magnus, tunc retingendus Cancer, donec Radices decidant, quod fiet 18 *vel* 20 *Die: At ſi in medio, ut aliquando, Radix magna, profunda & dura reperietur, tandem* 11 *Die decidet, quod ſi Ægro ex-*

...spectandum est, nihil tamen innovandum aut Vi ...procurandum. Si minima Radicula remaneret, ...fectum est Opus; ubi vero Cancer decideret, ... Mundificatio & Cicatrizatio procurabitur ...di Unguento & Pulvere.

Rs. Litharg. Auri, Unc. ij. Mummiæ, Unc. j. Ol. Rosat. Unc. jſſ.. Aceti Rosat. parum agitentur in Mortario Plumbeo, eodem Distill. ut Arcanis est.

Rs. Oliban. opt. Mummiæ, Mastic, Myrrh, Aloes, Sarcocol, ana Drachm. j. Opoponacis abstat. in Aq. Plantan. vel Rosar. Unc. ſſ. ms. Pulvis ad Cancrum applicand.

Fuchius's *Experiment upon one* Benedict Calender, *who labour'd under a Cancer of his Breast, and was cured.*

'TAke *Auripigmentum* reduc'd to an Alcool one Part, Roots of Arum in 'Powder, four Times the Quantity, in 'Measure, not in Weight; a little Soot, 'mix them together for a Powder, to be 'us'd as hereafter. The *Cancer* has several 'Vessels like Roots, which swell with a 'viscid tenacious Blood, so that they can'not be extirpated without the Roots: But 'this Powder will at once perform the 'whole Operation, because it remains till 'the Cure is compleated.

'When this Powder is applied, we are 'to remove nothing, neither are we to add 'any Medicines, Anodines or Emollients, 'for it is dangerous to the Patient; but on 'all Sides we are to apply Defensatives or 'Repellers, about a Fingers Breadth, so that 'the Inflammation may be prevented: Be'cause while the Medicine penetrates and 'acts through the Roots of the Cancer, the 'Pain will be great, tho' it lasts not con'tinually, but by Intervals; and when the 'Roots are broke, a Quantity of Blood and 'Water issues forth, and upon that Irruption 'the Pain ceases.

'A great deal of this Humour will flow 'one Day with another, but yet the Medi'cine is not to be taken away, but a Lini'ment apply'd, where the Flux does not 'prevent, and upon the Tumour a Defensa'tive round the Medicine of half a Fin'ger's Breadth, with Bole, Oil of Roses 'and Vinegar. The Pain will be great 'Night and Day whilst the Cancer main'tains its Ground, till the Roots break off, 'which may be done the 18th or 20th Day. 'But if the Root, as it happens sometimes, 'be large, deep and hard in the Middle, 'then it will take Forty Days to overcome 'it: But if the Patient do expect this, and 'be disappointed, he ought to attempt no'thing new, or endeavour to remove it by 'Force. If the minutest Fibre remain, the 'Work is imperfect; but where the Cancer 'falls, it ought to be cleans'd and cicatriz'd 'by the following Ointment and Pow'der.

'Take Litharge of Gold, two Ounces; 'Mummy, one Ounce; Oil of Roses, one 'Ounce and half; a little Vinegar of Roses: 'Beat them together with a Lead Mortar 'and Pestle to an Ointment.

'Take Olibanum, Mummy, Mastick, 'Myrrh, Aloes and Sarcocol, of each one 'Dram; Opoponax wash'd in Plantane or 'Rose Water, half an Ounce: Make a Pow'der to apply to the Cancer.

Thus far *Fuchius.*

Monsieur *Alliot* asserts, That the Cure of the *Cancer* consists in the Mortification of the Acids, by Alkali's and Absorbents; that the Business in Hand is to mortify the sharp and cancerous Ferment engag'd in the Part affected, by consuming the infected Flesh and Glands; that to tame this Monster, we are to absorb a very exalted and a very corrosive Acid, by an absorbent proportion'd of the same Acid which is to be destroy'd; and that of this Kind, the Effect is produc'd by the gentle Caustick, which was invented by his Father, and proposed in a *Thesis* printed at *Paris* in 1665, and which he has rectified to publish it, as we see at the End of this Author's Book, which maintains that his Absorbent alone, by slow Degrees, consumes the Flesh imbib'd by the *Carcinomatous Virus*; that by its Use we see from Day to Day what Progress we make in following the Tract of this acid Corrupter, by mortifying and absorbing it as far as it can have penetrated, without the Fear of any ill Symp-

toms. He aſſures us, That the Operation of the Cauſtick is neither too ſluggiſh nor too violent; that it does not diſſolve like ordinary Cauſticks, and that it attacks nothing beſides its acid Adverſary, which being at laſt deſtroy'd and annihilated, diſſipates all the Hardneſs, and cauſes the Pain to ceaſe, the laudable Suppuration intervening, which drives away the laſt Scars, after which he clears and incarnates it, and procures a good and ſolid Cicatrizing.

Mr. *Helvetius* takes a View of the *Cancer* in three different Eſtates: He ſays firſt, that in the Beginning 'tis a very inconſiderable Diſeaſe, and eaſy to cure, either by diſſolving the ſmall Portion of Humour then but imperfectly coagulated, or conſuming it by ſome gentle Cauſtick. Secondly, that when the Humour is entirely harden'd, and the Tumour enlarg'd by the Conjunction of freſh Humour, which inceſſantly comes to coagulate with the firſt, great Care muſt be taken not to apply any Remedy, for fear of irritating the Humour, ſetting it in Motion, and diſperſing the Leaven; but that in this Caſe we are to open the Skin at the Place where the Tumour is, and extirpate the Gland which forms it, which is at once to bring away the Evil and the Cauſe of it. Thirdly, That when the *Cancer* is come to ſuch a State as to be open, that the Ferment is diffus'd, and that the Patient feels her ſelf drawn by little Cords, the Operator muſt immediately apply to the Amputation of the whole cancerous Part, and of the entire Breaſt. Becauſe he may then take away at once all the Ferment, and all that has imbibed it.

You have now heard theſe Phyſicians Sentiments: We ought next, as Monſieur *Dion* ſays, to enquire what Surgery orders to be done; for it is not Words but Action that muſt deſtroy this Evil. Surgery, ſays he, commands the Operation to prevent Death, which would be infallible without its Aſſiſtance. When the *Cancer* is confirm'd, becauſe we cannot often deſtroy it at its Birth, we muſt then with the Knife take off this Maſs of Fleſh, and the ſooner it is done, always the better, after having determin'd whether we are to proceed to Extirpation or Amputation; for theſe are two Operations different from each other.

Extirpation is practis'd when the *Cancer* is not open, and the Tumour no bigger than a Walnut, or at biggeſt a ſmall Egg. The Surgeon makes a croſs Inciſion in the Skin of this Riſing, he ſeparates from the Gland with a Penknife the Four Bits of Skin which make the Four Angles of the Wound, then with ſome Inſtrument he holds faſt the Gland to diſſect it from all its Circumſtantials, and lifts it out quite entire. The Surgeons formerly made uſe of one or two Inſtruments to hold the Gland, as in Enchiſtous Tumours; but *Helvetius* has invented a Pair of *Forceps*, which are very commodious, and to which he gave the Name of *Helvetian Forceps*.

This is an Operation that has made Noiſe enough at *Paris*; 'tis agreed, that it may ſucceed provided the Patient be young, and of a ſound Conſtitution; and 'tis alſo adviſed to be undertaken when the *Cancer* has not taken up the whole Breaſt, when the Tumour is not adherent to the neighbouring Parts, and when 'tis moveable throughout. But in order to proclaim Victory, a Surgeon muſt not take a Gland charg'd with Matter for a *Characteriſtick Cancer*, as ſometimes thoſe do who boaſt of having cured Thouſands. A Woman to whom I applied a Plaiſter compos'd of *Mucilages* and *Vigo's Plaiſter* diſſolv'd in Linſeed Oil on a ſmall Tumour on her Breaſt, which this Remedy diſſipated, ſome Years after told Mr. *Dollart* the Father, that I had cured her of a *Cancer*. He came to me to ask, With what Remedies I had perform'd the Cure? I did not take the Honour of a Cure which I had not perform'd, but own'd that it was not a *Cancer*, but only a tumefied Gland, which was diſſolved in a Month's Time. 'Tis now Seven or Eight Years ſince the Marchioneſs of *Blauſac* had one of the ſame Nature, of which ſhe was cured; and the Marchioneſs of *Dangeau* alſo had one three Years ago, which was diſſolv'd by the Application of Remedies, and if theſe Glands had been extirpated, the Publick would infallibly have repreſented them to have been Cancers.

Amputation is perform'd when the *Cancer* occupies the whole Breaſt, or when 'tis ulcerated, and its Lips appear to the Eye diſmal, hard and corrupted, by reaſon there is no other Way of delivering the Perſon from this

terrible Diſeaſe than entirely cutting off Breaſt, which the Surgeon performs, du- obſerving what is to be done before, du- g, and after, the Operation. Before the eration, purſuant to the Advice of an Physician, the Patient muſt be prepar'd th Bleedings, Purgations, Opiates, and er proper Remedies. If the Patient has Terms regularly, we muſt wait till they paſt, and the Day being fix'd, we diſ- the *Apparatus*, which conſiſts of a edle threaded with a ſmall String, a Ra- or a good Knife, Styptick Waters, Aſtrin- nt Powders, ſmall Cauſtick Buttons of itriol in caſe of Need, a great many dgets, a Plaiſter, Bolſters, a Napkin, and ſcapulary Bandage.

In the Operation, the Patient is to be uated in a convenient Poſture both for r and the Surgeon, that is, half lying on r Back: The Arm on the Side on which e Tumour is, muſt be rais'd and turn'd hind her, that the ſaid Tumour may ſhow lf the better, and the pectoral Muſcle a little withdrawn from below the Tu- our. The Surgeon then with Ink traces the whole Circumference, which is the lace where the Inciſion is to be made; en running a crooked Needle croſs the ody of the Tumour, which is threaded th a String, whoſe two Ends are tied, and ith which he makes a Nooſe that ſerves to ain the Tumour, and in drawing it, to parate it from the Ribs; then with a Ra- or a large flat Knife, which I find more mmodious than the Razor, the Surgeon us at the mark'd Place, and takes off the hole Body of the Breaſt in a ſhort Time. his Operation is eaſier than is imagin'd be- e 'tis perform'd; for the Breaſt ſeparates s eaſily from the Ribs, as when we divide e Shoulder from a Quarter of Lamb.

After the Operation, the Blood muſt be low'd to flow for ſome Time, and the Sur- on alſo with his Hand preſſes the Part ound the Wound, to make it diſcharge e Veins of the blackeſt Blood, which they ve receiv'd from the Tumour. We have ven over the Uſe of the Searing-Irons, all'd Fire Buttons, and that of the red-hot t Iron, which was formerly appropriated the Wound to dry and conſume the reſt that voracious Acid which was believ'd to have remain'd. Theſe hot Irons make the Patient tremble, and are not really of any Uſe, ſince the aforeſaid Remainder never fails to drain off with the Humour which is preſs'd out of the Wound. If the Blood flows out in too great Abundance, the Surgeon applies the ſmall Vitriol Buttons to the Orifices from whence it ſprings, and makes uſe of Aſtringent Powders; but if there happens no *Hemorrhage*, he only covers the Wound with dry Pledgets, and over them a great one made of Tow, and cover'd with Aſtringent Powders, incorporated with the White of an Egg. We uſe a Plaiſter of *Diacalcitis*, then a Bolſter and a Napkin, with which we make a circulary Bandage about the Body, and which we faſten to the ſcapulary Bandage. Monſieur *Helvetius* orders the laying on the *Thorax* a Napkin ſeveral times double, and moiſten'd in Beer and freſh Butter beaten together. This is a Practice uſual in *Holland*, and (as he informs us) prevents Inflammation.

'Tis not ſufficient to have perform'd the Amputation of the *Cancer*, but the Surgeon muſt, by a judicious Conduct, endeavour to cure the Wound, which is not always in his Power. The *Cancer* being taken off, he uſes the ſame Remedies as though it yet ſubſiſted; that is, to obſerve a ſtrict *Regimen* of Living, ſollicitouſly to avoid all Acids, *&c.* or any Thing in which we ſuſpect any fix'd corroſive Salts, becauſe they coagulate the Blood: On the contrary, the Nutriment muſt abound with volatile alcalous Salts, becauſe they diſſolve the Blood, and prevent its Stoppage in the Parts. The Patient muſt breath a ſubtle thin Air, in order to render the *Lympha* more fluid and agile; the Belly muſt be kept open, and if any Evacuation is ſtop'd, all poſſible Endeavours are to be made to provoke it. All Manner of Anger, Uneaſineſs or Melancholy muſt be baniſh'd, by reaſon thoſe Paſſions coagulate the Liquors: On the other Hand, Joy and Tranquillity of Mind contribute to a gentle Fermentation of the Blood, and an equal Diſtribution of the Spirits through all the Parts of the Body. In ſhort, ſuch Medicaments muſt be made uſe of to mollify the Acrimony of the *Seroſities*, as *Diaphoreticks* and *Alkalis* both fix'd and volatile.

The

The Surgeon is to dreſs the Wound with Unguents that abſorb this malignant Seroſity in which the adjacent Parts are ſoak'd. If there remain yet any of thoſe ſmall Spouts which convey the *Cancer* to the Intercoſtal Spaces, he muſt by his Cauſticks deſtroy them by ſlow Degrees, and in this Caſe Mr. *Alliot*'s Remedy is of excellent Uſe. We may alſo apply the Unguent preſcrib'd by Mr. *Helvetius* in his Letter concerning the *Cancer*; but above all, thoſe Remedies are to be avoided which cauſe too much Pain. When the Wound is well cleans'd, and the Fleſh of a beautiful *Vermilion* Colour, the Surgeon muſt procure its cicatrizing, which always takes up a very long Time, as well by reaſon of the very round Figure of the Wound, as the Quality of the Humour which caus'd the Diſtemper, and which commonly baffles all Remedies. When the Wound is heal'd, the Patient muſt not diſcontinue the Uſe of internal Remedies for ſome Years, leſt a freſh Tumour ſhould break out on ſome other Part, and produce a new *Cancer*.

I ſhall conclude this Article, ſays Mr. *Dion*, with the Relation of one which was cut off at *Marſeilles* about four Years ſince: Paſſing through that City with the Princes, Mr. *Du Chene* and I were deſired by Mr. *Le Bailly de Noailles* to ſee Madam *De Montreuil*, who had been long afflicted with a Tumour in her *Right Breaſt*. Two of the moſt celebrated Phyſicians and two Surgeons met us at the Hour appointed by Mr. *Du Chene*, and endeavour'd by a long Diſcourſe to prove, that the firſt Cauſe of this Tumour was from that Lady's ſuckling one of her Children about ten Years paſt. The other thought he hit the Work better, in pretending, that her Husband having had a Venereal Diſtemper, might have communicated it to his Wife, and that this was the true Cauſe of the Diſeaſe in Queſtion. When it came to my Turn to ſpeak, I told them, that they talk'd like able Phyſicians, who dwelt no ſmall Time on the Cauſes of Diſeaſes, and ſometimes aſſign'd very remote ones; that for my Part, I talk'd like a Surgeon, and concluded it was a perfect *Ca*... that without branching my ſelf into ... Arguments to prove it, they need only ... upon it; and that I knew no other ... medy in the preſent Caſe than Am... tion. Mr. *Du Chene*, who was of my ... nion, advis'd the Patient to reſolve to ... dergo that Operation, there being no ... Way left of ſaving her Life.

The next Day, Madam *De Montreuil* ... ving deſired me to viſit her, I confi... what we had ſaid the Day before, repr... ting to her, that ſhe had no other C... but that Operation or Death. I told ... that the Operation ſeem'd more frigh... before, than it was painful or inſuppor... afterwards; upon which, ſhe, like all o... Patients, preferring Life to the Loſs o... Member, determin'd to undergo it. ... would have deſired me to have perfor... the Operation, but that ſhe had then ... Terms, and having no more than two D... to ſtay at *Marſeilles*, I could not ſatisfy ... There was no Surgeon at *Marſeilles* that ... ever perform'd the Operation, and the L... dy would not remove to any other Pl... The Coach incommoded her too much, ... reaſon that the cancerous Maſs was ve... weighty, and the leaſt Shaking, even th... of a Chair, caus'd very violent Pains. S... at laſt choſe Mr. *Geofrey*, Surgeon Majo... the *Marines*, with whom I confer'd on t... Operation. I adviſ'd him to perform ... ſeating the Patient in an Elbow Chair, wi... an Iron to let the Back downwards, leani... on her Back, that he might leave her as ... were lying after the Amputation; not ... run either the Needle or the String throu... the Tumour, but ſpare her that Pain; ... ſuſtain the Maſs with his Left Hand, wh... he made the Inciſion with his Right, te... ling him, that thus he would take off bo... the *Cancer* and the Breaſt without puttin... the Patient to an extreme Pain. This w... accordingly perform'd fifteen Days after o... Departure as we order'd it. We receiv'd t... News of the Succeſs, and afterwards of ... perfect Cure of the Patient.

Som...

me new Diſcoveries relating to the Cure of Cancers. *By* William Beckett, *of* London, *Surgeon.*

THE more inquiſitive and learned Part of the World are at this Time very well aſſur'd, that the Animal Body is an exquiſitely fram'd Ma-, and that its Compoſure is little elſe n a *Compages* of branching and winding als, which are kept to a moderate De- of Extenſion by Fluids of different tures, and that the Motions of theſe were determin'd by the Divine Architect. s in a Natural, the whole Fabrick is rn'd by certain Laws impreſs'd on the ds; and we often find the unhappy nſequences of the Diſcompoſure of a Part diſcover themſelves firſt by an Interrup- of the Motion of the Animal Juices. s in a *Cancer* of the Breaſt, which pro- s from a Blow or Bruiſe, as upon ſtrict uiry we have found they moſt common- o, Is it not probable, that by ſuch Means onfuſion of the true Order of the little dulous Grains, and their excretory Ducts, happen; and at the ſame Time an ex- ſated *Lympha* may lodge in ſuch a ngy Texture, which in Time becoming d, will coaleſce with the glandular ſtance, and form a Maſs conſiderably pact? Now this being ſo, 'tis reaſonable believe, that as the Lymphatick Juice inues its Motion till it arrives at the in- ted Part, its Paſſage muſt be embarraſs'd e; upon which, 'twill ſoon be qualify'd an Union with the remaining Part of glandulous Subſtance of the Breaſt, and e whole be perfectly chang'd from what as before.

his *Hypotheſis* is in a great Meaſure unded on Experiments; for if we expreſs ice from ſome of the cancerous Maſs, hold it in a Spoon over a Fire, there mediately flies off a ſmall Vapour, and Remainder hardens, not unlike the White an Egg boil'd. This ſhows it to have the Properties of the *Lympha*; for the Chymical *Analyſis* of that Liquor aſſures us, 'tis a Compoſition of a great deal of fix'd Sulphur, a little volatile, ſome Flegm, and much volatile *Alkali*, to which ſome add a little Earth. Now while the *volatile Alkali* keeps the *Sulphur* diſſolv'd, the *Lympha* remains in a State of Fluidity; but when by making the ſame Experiment, the *volatile Alkali* is evaporated, the Remainder hardens, and forms a pretty compact whitiſh Subſtance. From hence the judicious Surgeon may eaſily deduce the Reaſon why this Sort of Tumours can never be brought to Suppuration.

We ſhall not be ſo particular as to mention thoſe *Cancers* which proceed from internal Cauſes, nor ſeveral other Things which relate to the former; for what we have here ſaid, we look upon to be commonly the Method of the Formation of them, and as ſuch, we did endeavour to calculate Remedies that ſhould peculiarly operate on the *Maſs*, ſo as to diſunite the firm Coheſion of its Parts, and diſpoſe 'em to ſeparate and come away without any great Inconvenience to the Patient, which is what we would recommend with all the Earneſtneſs imaginable to thoſe that are deſirous of diſcovering a Method of curing *Cancers*. We were before ſenſible, that it was poſſible for one Body to operate on another determinate Body, without being able to have any ſuch Effect on innumerable others; as *Quickſilver* will diſſolve Gold, *Aqua fortis* Iron, *Vinegar* the Shell of an Egg, *Oil* common Sulphur, *&c.* which won't have any ſuch Effect on ſeveral other Bodies; for there's nothing more certain, than that the Operations of Diſſolvents are ſo determin'd by the various Textures of the Bodies on which they are employ'd, that a Liquor that is capable to corrode a more hard and ſolid Body,

dy, may be unable to diſunite the Parts of one more ſoft and thin, if of a Texture indiſpos'd to admit the ſmall Parts of the *Menſtruum.*

It may be expected I ſhould ſay ſomething in relation to that which is generally look'd upon to be the grand Cauſe of the Incurableneſs of *Cancers*; I mean, the acid Humour in the Blood: But if thoſe who are fond of entertaining this Opinion, do but conſider, that *Cancers* are often form'd in a perfect State of Health, and that during the Time the cancerous Subſtance diſſolves and comes away according to our Method, the Sides will run a digeſted Matter, and heal by the Application of dry Lint only, they will be of my Opinion, that neither the *Atrabile* of the Ancients, the *corroſive alkalious Salt* of the Chymiſts, nor the predominant *Acid* of the reſt of the Moderns, are capable of procuring thoſe Alterations that *Cancers* are ſometimes attended with.

If we trace the Writings of our Predeceſſors to their earlieſt Date, we ſhall find, that many of them have made Mention of the Roots of the *Cancer*, which they took to be the large blue Veins that are often extended on its Surface, and the entire Removal of theſe they thought to be abſolutely neceſſary, or the Patient could not be cur'd: But I believe there is no Body at this Time that conſiders the Mechaniſm of the Parts in ſuch a Condition, but will agree, they are the neceſſary Conſequents of it, and that their Abſence or Preſence are of no Importance. That the *Cancer* is ſometimes attended with Adherents or *Appendices*, w may very well reſemble Roots, we ar ſur'd; but theſe generally lie deep, an not eaſy to diſcover. The moſt conſide one that ever I ſaw, was very near five ches long, and of an unequal Bigneſs. Part of it did not exceed the Largeneſs Gooſe's Quill, but ſome others were ne big as the Top of ones Thumb, whic ſembled ſo many Knots in it. It divide the Middle, and continued ſeparated a an Inch and a half, and then reunited was of a more tender Subſtance than Body of the *cancerous Maſs*, but of the Colour, and was probably the Juice was laſt apply'd to the *Cancer*, which aſſ a Form agreeable to the Cavities it l it ſelf in. Such Adherents as theſe, more inclin'd to believe, are the Cau the unſucceſsful Attempts on *Cancers*, any *Acid* in the Blood; for there are Perſons but are acquainted with Medi that are capable of correcting its *Acidity* w it happens, and had the Cure of *Cancers* pended on that, I am poſitive they wo not at this Time have had ſuch ill Chara We have already ſhown, that *Cancers* generally their Riſe from a Blow or a Br and that when the Body is in an healt Condition, and the Blood and *Lympha* perate and ſweet. Now if there is al an *Acidity* of the Blood when Perſons afflicted with *Cancers*, the *Cancers* muſt ſom times cauſe it, and not the *Acid* in the B the *Cancers.*

A Solution of ſome curious Problems concerning Cancers. *From the Author.*

PROBL. I. *Whether the cancerous Juice is corroſive or not?*

WE cannot come to a certain Knowledge of the Principles of the Juice which is lodg'd in the cancerous Subſtance, altho' it enjoy'd the very ſame Properties of that which is diſcharg'd from an ulcerated *Cancer*, from the Account which Authors have given of the latter; for they have differ'd very much in determining the Nature of the Salts with which they ſuppoſe it abounds. *Helmont*, *Van Horn*, and moſt of thoſe Gen men that were Chymically inclin'd, of Opinion they belong'd to the Alk Family; but a far greater than thoſe thought they are *Acid*. *Riolan* the Fa in his Chirurgical Works, without g his Opinion what the conſtituent Parts o purulent Matter are, affirm'd it to be as ſt as Poiſon, and that no Death could b

ris'd too cruel for ſuch a one as ſhould give e to a Man. This Author then proceeds o tell the Story of Mr. *Smith*, formerly one f the Surgeons of St. *Thomas*'s Hoſpital, ho died of a Conſumption a few Months fter the taſting of this Juice, and then ould account for it, that his Death was ot procur'd by the Action of any corroſive alts, Acid or Alkaline, but by the extraor-inary Stench and Malignity of the Matter; when it does appear plain, that his Death as occaſion'd by the taſting of the Juice of cancerated Breaſt, otherwiſe than as it ight work upon his Imagination, which we find by Experience) is very powerful, nd performs Wonders which are beyond he Strength of our Reaſon to account for.

PROBL. II. *Whether* Cancers *are contagious or not?*

There have been great Conteſts among the Learned as to this Point; but *Zacutus Luſitanus* propoſes to prove it by Reaſon and Experience. His Reaſons are, 1. Becauſe in an ulcerated *Cancer* there is a cadaverous Stench and Rottenneſs, which infects the neighbouring Parts with its Virulency; 2. Becauſe a *Cancer* is the ſame Diſeaſe as an *Elephantiaſis* and Leproſy of a particular Part. To this *Sennertus* anſwers, That all corrupted and fœtid Subſtances are not contagious; for in a *Gangrene* and *Sphacelus*, there is the greateſt Corruption and offenſive Smell, yet we don't find that any Perſon is kill'd by it. He adds, though a *Cancer* has ſome Reſemblance to an *Elephantiaſis*, they are different Diſeaſes. *Luſitanus* deduces his Experience from an Obſervation of a poor Woman, that having an ulcerated *Cancer* in her Breaſt, and lying with three Children, they were affected after the ſame Manner by the Contagion. He ſays, that two of them died; but the third, which was of a ſtronger Conſtitution, had the *Cancer* cut off by a Surgeon, and was cured. *Sennertus* is of Opinion, that theſe Children did not contract the Diſeaſe by Contagion, but that it was by Hereditary Succeſſion.

However, we will not enter into any particular Inquiry about theſe Authors Reaſons, but only relate ſome Matters of Fact to prove that *Cancers* are contagious, if the *cancerous* Matter comes to an immediate Contact with a ſoft and glandulous Part. A Tradeſman's Wife in *Nottingham* being ſo unhappy as to labour under a *Cancer* in one of her Breaſts, her Husband was of Opinion he could relieve her by ſucking it. Accordingly he put this Method in Practice, in Hopes (without Doubt) he could effect a Cure by drawing the *cancerous* Matter out of the Nipple. He continued his Attempts for ſome Time, but found it did not anſwer his Deſign; for though a ſmall Quantity of Matter was diſcharg'd this Way, the Diſeaſe ſtill became worſe, and ſhe terminated her Life ſoon after. Two Months were ſcarce expired before the Husband of the Deceas'd came up to *London*, upon account of a Swelling he had aroſe on the Inſide of the upper Jaw. He apply'd himſelf to ſome ingenious Surgeons for Advice, who aſſur'd him, he muſt undergo the Drawing of ſeveral Teeth on that Side of the Jaw which was affected, and have the Swelling, and Part of the Jaw-Bone if neceſſary, cut away. He return'd very much diſſatisfy'd with ſo harſh a Propoſal, and became a Patient to a Perſon who undertook to cure him with *Gargles*, and ſuch inconſiderable Remedies: However, by the Uſe of theſe Things, he was of Opinion he became much better, and thought he ſhould be cur'd. Upon this, he retired into the Country to his Buſineſs; but in leſs than a Month's Time he was oblig'd to come up again, and have the former Method put in Practice: But the *Sore* could never be brought to cicatrize, and the *Cancer* continued to ſpread till it had extended it ſelf over moſt of the inward Parts of the Noſe. In this unhappy Condition he liv'd ſome Time, but at laſt became ſo frightful an Object, and the Stench proceeding from him ſo offenſive, that he retired from the World and died in Obſcurity.

Since this, I have been inform'd by a foreign Surgeon of a very odd Accident, which happen'd upon a Woman's having an ulcerated *Cancer* in her Right Breaſt. It was, that ſhe being poor, for Want of other Conveniencies, ſuffer'd two Children ſhe had to lie with her in that Condition. At length one of 'em, a Girl about five Years old, began to be afflicted with a ſmall painful Tumour in one of her Breaſts, which

increaſing to near the Bigneſs of an Egg, became livid, and entirely *cancerous*. The Mother died ſome Time after, and the Child did not long ſurvive her; but the other Child continued well. Several Surgeons gave their Sentiments of this Caſe: Some thought it to be an Hereditary Indiſpoſition; but conſidering the Mother had no Appearance of a *Cancer* before, or at, the Birth of the Child, I cannot but readily embrace the Opinion of thoſe Gentlemen that were inclin'd to believe that it was contracted by Contagion, ſeeing the Poſition of the Child's Body was ſuch in Bed, that that Part of it which was affected, was almoſt always diſpos'd to rub againſt the Dreſſings ſoak'd in Matter, the Mother taking very little Care to change them often. Now it is not at all probable, that the malignant *Effluvia*, which continually paſs off from the *cancerous* Maſs and the putrefy'd Matter, can diſpoſe a Perſon at any little Diſtance to be affected with the like Diſeaſe, for then the other Child would have become a Sufferer; but it may happen in ſome extraordinary Caſes, where the corrupted Fluid has attain'd an exalted Pitch of Malignity, to communicate ſome of its more active Particles to the Blood and Spirits, and ſo cauſing a very great Diſorder in their Motions, produce a violent Fever and Confuſion of the whole Oeconomy, ſo as to occaſion a Perſon's Death.

PROBL. III. *Whether if the extirpating a* cancerous *Breaſt happens to be ſucceſsful, it ought to be look'd upon as a Conſequent of performing the Operation better than our Predeceſſors?*

By the Account we receive from Authors, we cannot be poſitively aſſur'd, whether there was any particular eſtabliſh'd Method in the firſt Ages of this Art for the Performance of this Operation. This we are only aſſur'd of, that there are ſome Circumſtances which relate to it that have been taken Notice of, the moſt conſiderable of which is, that the actual Cautery was to be apply'd immediately after the Abſciſſion. This they adviſ'd, not only to put a Stop to the Flux of the Blood, but likewiſe to correct the ill Quality of it. 'Tis to be obſerv'd, that they order'd always upon ſuch Occaſions Defenſatives to be apply'd to contiguous Parts, to prevent their being flam'd; but for as much as they were ſible the actual Cautery would procu Eſcar, they recommended the Uſe of geſtives to ſeparate it; after which, propos'd to heal it as a common Ulcer. very next Advance this Operation rec that we have met with, was by the accu *Arcæus*, who oblig'd the World with exact and methodical Account of the w Procedure in extirpating a *Cancer* in *Breaſt*, though this Author would only ture on thoſe that were not ulcerated, l ing upon thoſe that were as incurable. don't find that this Method was recomm ded to the World by any remarkable Hi ries of Cures affected by it; whether it pr ceeded from the Unſucceſsfulneſs of Attempts, or its Diſuſe, we cannot de mine.

Fabricius Hildanus likewiſe made a con derable Step towards the encouraging performing this Operation; and he aſſu us, he has more than once done it wi Succeſs. He did not only influence Contemporaries to revive an Operation, th was perhaps almoſt grown out of Date, the Hiſtories of ſome Caſes he recites, oblig'd them with the Figure of a Pair *Forceps*, which in this Operation are ve convenient to engage the Breaſt, and the by prevent the Pain the Patients are ſom times put to by piercing the Breaſt wi Needles, arm'd with Silk, to ſuſpend There are ſeveral Ways of performing th Operation mention'd by later Practitioner but at this Time there are few that are wi ling to be concern'd in it. A very conſid rable Author ſpeaking of extirpating a *cerous Breaſt*, adviſes us to take Care we not cut the Pectoral Muſcle in the Op tion; but we have ſeen a very remarka Caſe of this Nature, where a Part of th Muſcle was cut away, and the Cartila of two of the Ribs laid bare, and the tient happen'd to be cur'd. Now if Predeceſſors had ſo great a Reſpect to avoiding the wounding of this Part, a make their Inciſions too ſuperficial, t Operations muſt in all Probability be ſucceſsful; for we are very well aſſur'd Experience, that their actual Cauteries w hav

e no good Effect here, nor will they ſume the remaining Part of the *cancerous* ſs. We have experimented, that this ſtance upon boiling becomes hard and ble, and we will take the Liberty to give Opinion of the Uſe of Cauteries in this ſe.

The *cancerous Subſtance* we take to be no- ng more than a Transformation of the all glandulous Bodies which form the aſt, and a Lymphatick Juice, intimately corporated therewith into a hard, cloſe, ticiſh, and by common Medicines, indiſ- rable Maſs. In ſome Caſes, perhaps it y receive ſome Addition from ſome Jui- s which may diſtil from the contiguous res. This being granted, What Benefit n we reaſonably imagine will enſue on s painful Method? Will not the Fire, by ting the more fluid Parts of the *Maſs* to porate, actually dry up, torrify and har- n it, and ſo diſpoſe it for diſplaying a ain of miſchievous Effects on the conta- ous Parts? And all this without any very parent Decreaſe of it too: Nay, the very ucing of it to ſuch a Conſiſtence, which y much reſembles a Piece of burnt Horn, fficient to procure a perpetual Pain, ſee- g Medicines can hardly ſoften it ſo as to uce it to its firſt State.

PROBL. IV. *Whether a Salivation will cure a* Cancer?

The extraordinary Succeſs this Method has en attended with in ſome Caſes of the ateſt Difficulty, has ſo far recommended to the World, that it is at this Time be- me of ſo great Repute, that there are few ſons but what will willingly embrace it propos'd to 'em, provided they have found mer Methods prove ineffectual. I once w a Perſon who labour'd under an *ulce- d Cancer* in her Breaſt adviſ'd to it, and o had certainly undergone it, though trary to the Opinion of ſome Perſons cern'd, if in three or four Days Time had not been reduc'd to ſuch a weak ndition, that it put an End to the Con- verſy. That a *Salivation* has cur'd the ſt malign and ſpreading Ulcers, and e that have been of ſeveral Years Con- ance, notwithſtanding their Edges have n high inverted, and aſſum'd the Con- ſiſtence of a callous Body, we have found by ſeveral Inſtances; but that it ſhould cure a *cancerous* Ulcer, an Ulcer which is chiefly ſeated in a transform'd Animal Subſtance, and which has no Correſpondence with the contiguous Parts, is what we can't believe. One of the principal Effects of Mercury, if prudently given, is, that it attenuates the Juices, clears the Canals, deſtroys the ill Quality of that Fluid that has a Hand in cauſing any Obſtruction, and renders the Juices temperate and ſweet. By effecting this, it is that it cures ſo many different Diſeaſes, which perhaps have not ſo great a Diverſity in their Cauſes, but have different Appearances, which depend upon the Variety of the Parts where the Cauſe operates.

From hence any one may judge, that a Perſon who diſcovers a certain Method of curing *Cancers* by Medicines only will find, that it will not conſiſt in a Secret for purifying the Juices, which can have no Effect upon the *cancerous Maſs*, ſo as to procure its Diſſolution, and without a Remedy for which, his Method will be always unſucceſsful. *Mercklin*, in his Treatiſe of Tranſfuſion of Blood, tells us, we have no Reaſon to believe we may have Succeſs from Transfuſion in a *Cancer*; nor indeed would Injections ſucceed better, though perhaps by this Means it's poſſible ſo to alter the Fluids, that *Ulcers*, not *cancerous*, may be cur'd in a ſhort Time, as it once happen'd to a certain Perſon, who being under Cure for an inveterate Pox, had ſome Roſin of *Scammony*, infus'd in the Eſſence of *Guajacum*, injected into his Veins, which vomited him exceſſively; but his *Ulcers* were heal'd in three Days Time.

From what has been hitherto ſaid, it is evident, that a Salivation can never cure a confirm'd *Cancer*, becauſe it's not capable of procuring a Diſſolution of that hard Subſtance, which is the real *Cancer* it ſelf. The Glands, we have obſerv'd, with the extravaſated *Lympha* and its Veſſels, are perfectly chang'd to a different Subſtance to what they were before, all which make a Maſs of ſuch a Nature, that it will be impoſſible to procure its Diſſolution by any inward Means. If the *Cancer* was nothing more than a Coagulation of the Juices in the Veſſels, or

other Canals or Pipes, the Cure might be much more eaſily effected; but as the *Cancer* is conjoin'd with ſuch Circumſtances as we have mention'd, we may affirm, the Cure will be altogether impoſſible, without the whole Subſtance, with its *Appendices* or Branches, which we have found they often have, be taken away, or a perfect Diſſo tion of all of it be procur'd by ſome ex nal Remedy, which is capable of operat on it after ſuch a peculiar Manner, as diſſolve the *cancerous Subſtance* without ving any ſuch Effect on the contigu Parts.

A ſhort Account of the Abdomen *or Lower Bell From Mr.* Le Clerc, *Phyſician to the* Frenc *King, &c.*

THE cleareſt Diviſion of the Humane Body, and that which is moſt follow'd, is that which conſtitutes three *Venters*, that is to ſay, the Upper, the Middle, and the Lower, which are, the Head, the *Thorax* or Breaſt, and the *Abdomen* or Lower Belly; together with the Extremities. The Lower Belly is a Cavity of the Body that contains the Organs of Nutrition and Generation, conſiſting of three different Regions, the *Epigaſtrick*, the *Umbilical*, and the *Hypogaſtrick*. Its Extent reaches from the *Xiphoides* or Sword-like Cartilage to the *Os Pubis*; and its Diviſion conſtitutes the three Regions aforeſaid.

The Parts contain'd in the *Epigaſtrium* are, the Liver, the Spleen, the Stomach, and the *Pancreas* or Sweetbread. The Stomach takes up the Middle before, the Liver being plac'd on the Right Side, and the Spleen on the Left, ſo that theſe two Sides of the *Epigaſtrick* Region are call'd the Right and Left *Hypochondria*. The *Umbilical* Region contains the moſt Part of the ſmall Guts, as the *Duodenum*, the *Jejunum*, and the *Ileon*, which have their Reſidence in the Middle, where they are incircled with a Portion of the two great Guts, *Cæcum* and *Colon*, that take Poſſeſſion of the Sides, otherwiſe call'd the Flanks. The Reins or Kidneys are alſo in this Place, above, and ſomewhat backward. The greater Part of the thick Guts *Cæcum* and *Colon* are incloſ'd in the *Hypogaſtrium*. There is alſo a Portion of the *Ileon*, whi hides it ſelf in the Sides of the *Ilea* or H bones. In the Middle, under the *Os P* the Bladder is ſituated on the Gut *Rec* in Men, and the Womb in Women lies tween the *Rectum* or Straight Gut and Bl der.

The Diſſection or Opening of the *Ab men* in order to the Diſcovery of the Pa containing and contain'd therein, is beg with a crucial Inciſion in the Skin from u derneath the Throat downward, traverſi from one Side to another in the *Umbili Region*; then the Skin is rais'd, beginni at the four Corners, and the *Panniculus poſus* is immediately diſcover'd. Under Fat lies a fleſhy Membrane, call'd the *M brana carnoſa*, and under that the comm Membrane of all the Muſcles of the Lo Belly. Thus we have taken a View of wh Anatomiſts commonly term the five *Te ments*, that is to ſay, the *Epiderma* or Sc Skin, the *Derma* or true Skin, the *Panni lus adipoſus*, the *Panniculus carnoſus* or *M brana carnoſa*, and the common Membr of the Muſcles.

The five Teguments being remov'd, meet with as many Muſcles on each S *viz.* the Deſcending and Aſcending obli the Tranſverſe, the Straight, and the P midal, by the Means whereof the Belly extended and contracted. Afterwards pears a Membrane nam'd *Peritonæum*, w contains all the Bowels, and covers whol

hole Lower Belly, being ſtrongly faſten'd the firſt and third *Vertebræ* of the Back. he fat skinny Net, which lies immediately ider the *Peritonæum*, is call'd *Epiploon*, and *mentum* or the *Caul*. It floats over the owels, keeping them in a continual Sup- leneſs, neceſſary for their Functions, main- ins the Heat of the Stomach, and contri- utes to Digeſtion.

I ſhall begin with the Stomach, as the rſt Bowel of Nutrition, and the Recepta- le of the Aliment or Food, that is con- ey'd thither through the *Oeſophagus* or Gul- t, which is a Canal, or Kind of Straight ut, that reacheth from the Throat to the Mouth of the Stomach. The Stomach it lf is ſituated immediately under the Dia- hragm or Midriff, between the Liver and he Spleen, having two Orifices, whereof he Left or Upper is properly call'd *Sto- machus*, and the Right, at its paſſing out or ower Orifice, the *Pylorus*. Its Figure re- ſembles that of a Bagpipe, and the greater Part of its Body lies toward the Left Side. It is compos'd or made up of three Mem- branes, *viz.* one common, which it receives from the *Peritonæum*, and two proper, the two uppermoſt being ſmooth, and the in- nermoſt altogether wrinkled.

The *Pancreas* or *Sweetbread* is a fat Body, conſiſting of many Glandules wrap'd up in the ſame Tunicle, being ſituated under the *Pylorus*. It helps Digeſtion, and hath ſeve- ral other Uſes aſſign'd it, particularly that of ſeparating the ſerous Particles, which afterwards is convey'd from hence into the *Duodenum* by a Canal or Paſſage nam'd the Pancreatick Duct. This Juice contributes towards the Fermentation of the Chyle with the Choler, in order to ſeparate the groſſer Particles from thoſe that ought to enter in- to the Lacteals.

There are two Sorts of Guts, the thin and the thick, or the great and the ſmall, of the latter of which there are three Guts, *viz.* the *Duodenum*, the *Jejunum*, and the *Ileon*; and the great or thick Guts are the *Cæcum*, the *Colon*, and the *Rectum*. The thin Guts are thoſe that are appointed only to tranſport the Chyle out of the Stomach into the Ci- ſtern or Receptacle, whereas the thick are larger and ſtronger, ſerving to carry forth the groſs Excrements out of the Belly. The *Duodenum*, which is firſt of the thin Guts, is only twelve Fingers Breadth long; the *Jejunum*, being the ſecond, ſo call'd becauſe always empty, is five Foot long. The third is nam'd *Ileon*, by reaſon of its great Turn- ings, which oblige it to paſs to the *Os Ilion*, where it ſometimes produces a Rupture. It extends it ſelf almoſt twenty Foot in Length. The firſt of the thick Guts, known by the Name of *Cæcum*, is very ſhort, and properly only an *Appendix* or Bag of two Thirds of an Inch in Length. That which follows is the *Colon*, being the largeſt of all, and full of little Cells, which are fill'd ſometimes with Wind, and other Matters, that excite the Pains of the Cholick. It ſurroundeth the thin Guts in paſſing from the Top to the Bottom of the Belly by the Means of its great Circumvolutions, and is from eight to nine Foot long. The laſt is the *Rectum* or Straight Gut, ſo nam'd, becauſe it goes directly to the Fundament. It is no longer than ones Hand, but is fleſhy, and ſituated upon the *Os Sacrum* and the *Coccyx* or *Rump- bone*.

All the Guts have a periſtaltick or ſucceſ- ſive Motion and Undulation, whereby they inſenſibly puſh forward from the Top to the Bottom whatever is contain'd in them; and that Motion which on the contrary is perform'd from the Bottom to the Top, is term'd the Antiperiſtaltick, as it happens in the Iliack Paſſion or *Miſerere*, vulgarly call'd the Twiſting of the Guts.

The *Meſentery* is a Kind of Membrane ſomewhat fleſhy, which is join'd to the Spine in the Bottom and Middle of the Bel- ly, and by its folding, keeps all the Guts ſteady in their Places. It is all over beſet with Red, White, and Lymphatick Veſſels, that is to ſay, thoſe that carry the Blood, Chyle, and *Lympha*, which occaſions the laſt to run more freely, and to ferment. Three remarkable Glands are likewiſe ob- ſerv'd herein, the greateſt whereof lies in the Middle, and is nam'd *Aſellius's Pancreas*. The two other leſſer are call'd *Lumbar* Glan- dules, as being ſituated near the Left Kid- ney. From each of theſe Glandules pro- ceeds a ſmall Branch, and both are united together to make the great Lacteal Vein or Thoracick Canal. This Tube conveys the Chyle along the *Vertebræ* of the Back to the

Left

Left *Subclavian Vein*, from whence it paſſeth into the Aſcending *Vena Cava*, and deſcends into the Right Ventricle of the Heart, where it aſſumes the Form of Blood, from whence it paſſes to the Lungs through the Pulmonary Artery; then it returns to the Heart through the Pulmonary Vein, and goes forth again thro' the Left Ventricle of the Heart, between the *Aorta* or great Artery, to be afterward diſtributed to all the Parts of the Body. Thus is the Chyle diſcharg'd into the Blood, and circulates with it, till it is aſſimilated, and converted into its Subſtance.

The Liver, being the thickeſt of all the Bowels, is plac'd in the Right *Hypochondrium*, at the Diſtance only of a Finger's Breadth from the Diaphragm, its Figure much reſembling that of a thick Piece of Beef. It is convex on the Outſide, and concave within; its Subſtance is ſoft and tender, it's Colour and Conſiſtence being like coagulated Blood. It is cleft at Bottom, and divided into two Lobes, *viz.* one greater, and the other leſs. Its Office is to purify the Maſs of Blood by Filtration, and it is bound by two ſtrong Ligaments, the firſt whereof adheres to the Diaphragm, and the ſecond to the *Cartilago Enſiformis*. Two great Veins take their Riſe from hence, the *Vena Porta*, and the *Vena Cava*, which form innumerable Branches, as it were Roots, in the Body of the Liver. The Gall-Bladder is faſten'd to the hollow Part thereof, and diſchargeth its Choler into the Gut *Duodenum* through the Veſſels that bear the Name of *Meatus Choledochi* or *Ductus Biliares*. This Choler is not a meer Excrement, but on the contrary of ſingular Uſe in cauſing the Fermentation of the Chyle, and bringing it to Perfection.

The *Spleen* is a Bowel reſembling a Hart's Tongue in Shape, and ſituated in the Left *Hypochondrium*, over-againſt the Liver. Its Length is about half a Foot, and its Breadth equal to that of three Fingers, its Subſtance being ſoft, as that of the Liver, and its Colour like dark coagulated Blood. It is faſten'd to the *Peritonæum*, Left Kidney, Diaphragm, and to the Caul on the Inſide; as alſo to the Stomach by certain Veins call'd *Vaſa brevia*. Nevertheleſs, theſe Ligatures do not hinder it from ſhifting here and there in the Lower Belly, where it changes its Place, and cauſeth many ful Symptoms by its irregular Motions. Office is to ſubtilize the Blood by clean and refining it.

The Reins or Kidneys are Parts of a Conſiſtence, harder and firmer than the Liver and Spleen. They are both ſi ted on the Sides of the Umbilical Re upon the Muſcle *Pſoas*, between the Tunicks of the *Peritonæum*; but the R is lower than the Left. Their Shape re bleth that of a *French Bean*, and they rec Nerves from the Stomach, whence V tings are frequently occaſion'd in Stone licks. They are faſten'd to the Mid Loins and *Aorta*, by the Emulgent Arter as alſo to the Bladder by the Ureters. Right Kidney likewiſe adheres to the *Cæcum*, and the Left to the *Colon*. Their fice is to filtrate or ſtrain the Urine into *Pelves* or Baſins which they have in the M dle of their Body, and to cauſe it to through the Veſſels call'd *Ureters* into Bladder. Juſt above the Reins, on Side, is a flat and ſoft Glandule of Thickneſs of a Nut. They are nam'd *dulæ Renales*, or *Capſulæ Atrabilariæ*, becau they contain a blackiſh Liquor, which ſome think) ſerves as it were Leven for Blood, to ſet it a fermenting.

The Bladder is the Baſin or Reſerver the Urine, of a membranous Subſtance, the Stomach, being plac'd in the Middle the Hypogaſtrick Region, ſo that it is guard by the *Os Sacrum* behind, and the *Os P* before. Two Parts are to be diſtinguiſh'd therein, *viz.* its Bottom and Top. By its membranous Bottom it is join'd to the Navel, and ſuſpended by the Means of the *Urachus* and the two Umbilical Arteries, which degenerate into Ligaments in adult Perſons; as by its fleſhy Neck, longer and crooked in Men, and ſhorter and ſtraight in Women, it cleaves to the *Inteſtinum Rectum* in the former, and to the Neck of the Womb in the latter. Laſtly, its Office is to receive the Urine, to keep it, and to diſcharge it from Time to Time.

The Genitals in Men are, the Spermatick Veſſels, the *Teſticles*, and the *Penis*. The Spermatick Veſſels are a Vein and an Artery on each Side, the former proceeding from the *Aorta*

…or thick Artery of the Heart, and the …r from the Branches of the *Vena Cava* of …Liver. Theſe Arteries and Veins are ter…ated in the Body of the Teſticles, which …two in Number, inclos'd within the …um. The Office of the Teſticles is to …ate the *Semen*, which is brought thither …all the Parts of the Body through the …rmatick Veſſels call'd *Præparantia*, and …wards to cauſe it to paſs through others …'d *Deferentia*, to the *Veſiculæ Seminales*, …whence it is forc'd into the *Ureters* …ugh two ſmall and very ſhort Canals. …*Penis* or Yard is a nervous and mem…ous Part, well furniſh'd with Veins and …ries, containing in the Middle the Ca… of the *Ureters*. Its Extremity, which …iſts of a very delicate and ſpongy Sort …Fleſh, is call'd the *Balanus* or *Glans*, the …, and the Skin that covers it, the *Præpu*… or Fore-skin. Thus by the Means of …ſwell'd Part, and ſtiff through the Af…nce of the Spirits, the Male injects his …into the Womb of the Female to pro…ate his Kind.

The Parts of Generation in Women are, …Spermatick Veſſels, the *Ovaries* or *Teſti*…, and the Womb. The Spermatick Veſ… are a Vein and an Artery on each Side, …in Men. The *Ovaries* or *Teſticles*, ſituated …the Side, at the Bottom of the Womb, …almoſt of the ſame Bigneſs with thoſe of …, but of a round and flat Figure. The …cula or little Bladders which they con…, are uſually term'd *Ova* or Eggs by …dern Anatomiſts, and the Veſſels that paſs from theſe *Teſticles* or *Ovaries* to the *Cornua* of the *Uterus*, are call'd *Deferentia* or *Ejaculatoria*. The *Matrix*, *Uterus*, or Womb, is the principal Organ of Generation, and the Place where it is perform'd, reſembling the Figure of a Pear with its Head upward, and ſituated between the *Rectum* and the Bladder. It is of a fleſhy and membranous Subſtance, retain'd in its Place by four Ligaments faſten'd to the Bottom, whereof the two upper are large ones, proceeding from the Loins, and the two lower round, taking their Riſe from the Groin, where they form a Kind of Gooſe Foot, which is extended to the *Os Pubis* and the flat Part of the Thighs, which is the Reaſon that Women are in Danger of miſcarrying when they fall upon their Knees. The exterior Neck of the Womb, call'd *Vagina*, is made almoſt in Form of a Throat or Gullet, extending it ſelf outwardly to the Sides of the Lips of the *Pudendum*, and being terminated inwardly at the internal Orifice of the Womb, the Shape whereof reſembles that of the Muzzle or Noſe of a Puppy. The outward Neck of the Womb is faſten'd to the Bladder and the *Os Pubis* before, and in the hinder Part to the *Os Sacrum*. Between the Lips of the *Pudendum* lie the *Nymphæ*, which are plac'd at the Extremity of the Canal of the Bladder, to convey the Urine; and ſomewhat farther there appear four Caruncles or ſmall Pieces of Fleſh at the Entrance of the *Vagina*, which, when join'd together, make the thin Membrane call'd *Hymen*.

TAB.

TAB. I.

Fig. I. *Part of the* Cuticula *rais'd from the true Skin, as it appears by Magnifying Glaſs after it has lain ten Days in common Water. From Dr.* Drake's Anthropologia Nova.

A. The inferior or internal Surface of the *Cuticula* next the *Cutis.*

B. The exterior Surface of the *Cutis* next the *Cuticula.*

a, a. The Hairs which are common to the whole Body, and were rais'd with the *Cuticula.*

b, b. Their bulbous Roots, as they appear when drawn out of the *Foramina* that received them in the *Cutis.*

c, c. The *Foramina* or Holes of the Skin whence the Roots of the Hairs were extracted.

Fig. II. *The* Abdomen *open'd to ſhow its* Viſcera *in their natural Situation. In this Subject, the Skin and Fat were taken off the upper Part of the Body and Arms, to ſhow their external Muſcles. From the ſame Author.*

A, A. The internal Surface of the Skin cover'd with the Fat.

B, B. The internal Surface of the *Peritonæum*, as it appears when the Muſcles with it are divided croſsways at the Navel, and their four Corners turn'd out, to ſhew the Parts contain'd.

a. The Navel cut out, and left to ſhew the Ligament in Adults call'd the *Urachus.*

b. The *Urachus.*

c, c. The two Umbilical Arteries turn'd down.

C. The *Vena Umbilicalis* alſo chang'd to a Ligament here turn'd up, where Part of the *Ligamentum Suſpenſorium Hepatis* may be alſo ſeen ☿.

D. Part of the convex Surface of the Liver *in Situ.*

E. Part of the Stomach alſo ſeen in this Poſition.

F, F, F. The *Omentum*, as it uſually appears lying on the Guts. Here its Blood Veſſels may be ſeen, that paſs from the Stomach to it, call'd *Arteria & Vena Gaſtrica Epiploica Dextra & Siniſtra.*

G. Some of the ſmall Guts not cover'd by the *Omentum*, as they lie on the Beginning of the *Colon* in the Right *Ilium.*

d. Part of the *Muſculus Cremaſter*, as it deſcends on the Proceſs of the *Peritonæum* that incloſes the Spermatick Veſſels in their Progreſs to the *Teſtes.*

e. The Bladder diſtended with Wind, to make it appear in this Poſition.

f. *Os Pubis.*

g. The Enſiform Cartilage.

Fig. III. *The Cavity of the* Abdomen, *after its Muſcles and* Peritonæum *are remov'd, and the Stomach, Inteſtines and Meſentery, taken out, to ſhew as many of the reſt of its* Viſcera in Situ *as could well be expreſs'd in one View, the Skin and Fat being taken away.*

A. The ſuperior convex Surface of the Liver.

B. Its inferior concave Surface.

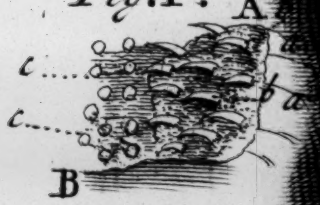
C. The *Ligamentum Umbilicale* turn'd upon the Cartilaginous Endings of the Ribs.

a. The Gall Bladder fill'd with Gall.

b. The

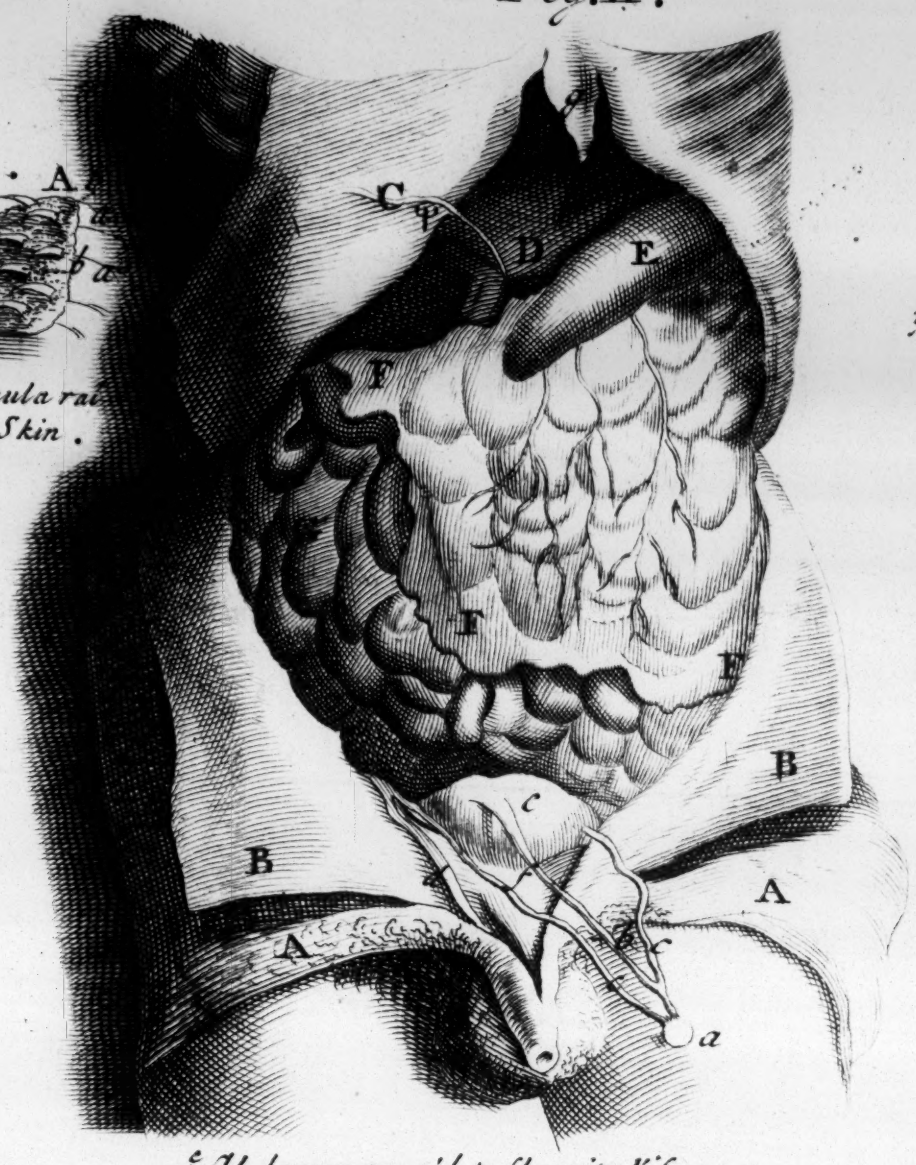
Tab. I.

Fig. I.



part of ye Cuticula rai
sed from ye true Skin.

Fig. II.



ye Abdomen open'd to shew its Viscera.

ye receptacle of ye Chyle & Mercury.

Fig. I.

ye Cavity of ye Belly
are remov

Tab. IV.

Fig. I. The hollow part of ye Liver revers'd.

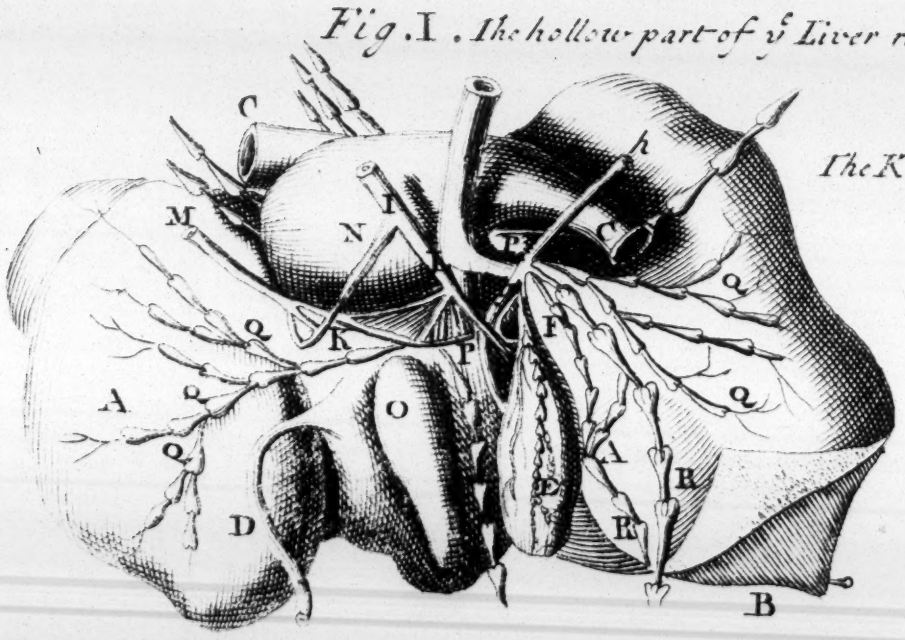


Fig. V.

The Kidney dissected

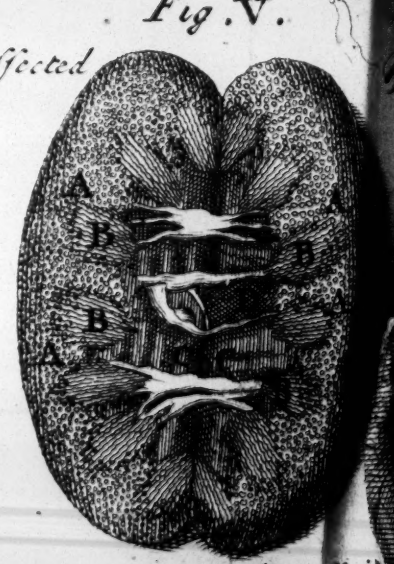


Fig. VI. The Vessels of ye Kidney.

Fig. III. Trunk of ye great Artery & Vena Cava.

Fig. II. The Concave part of ye Spleen.

Fig. VII. The whole Kidney divided

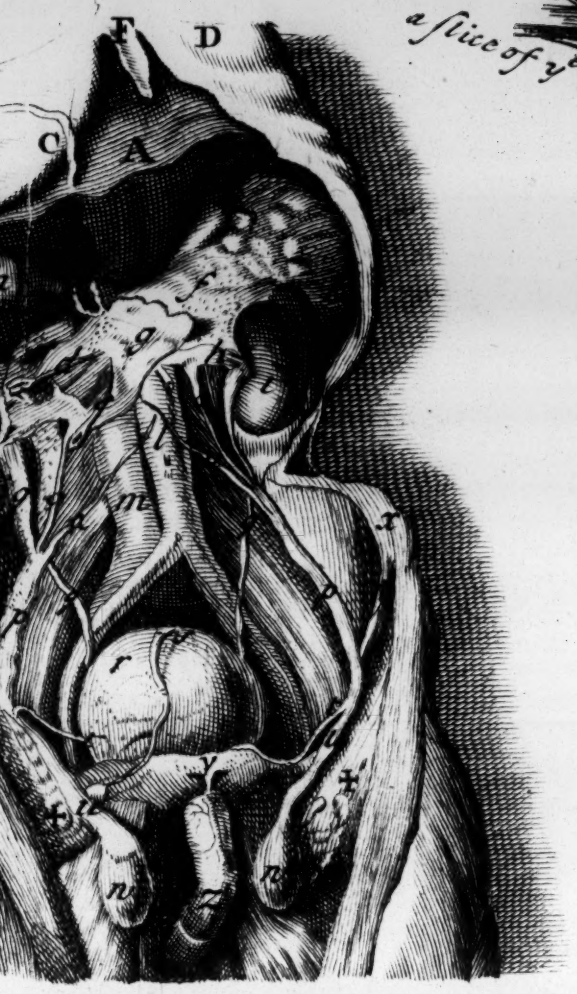
Fig. IV.

Fig. VIII. The Blood Vessels & Urinary Tubes expres'd.

Fig. II.

The Stomach w
ye Guts.

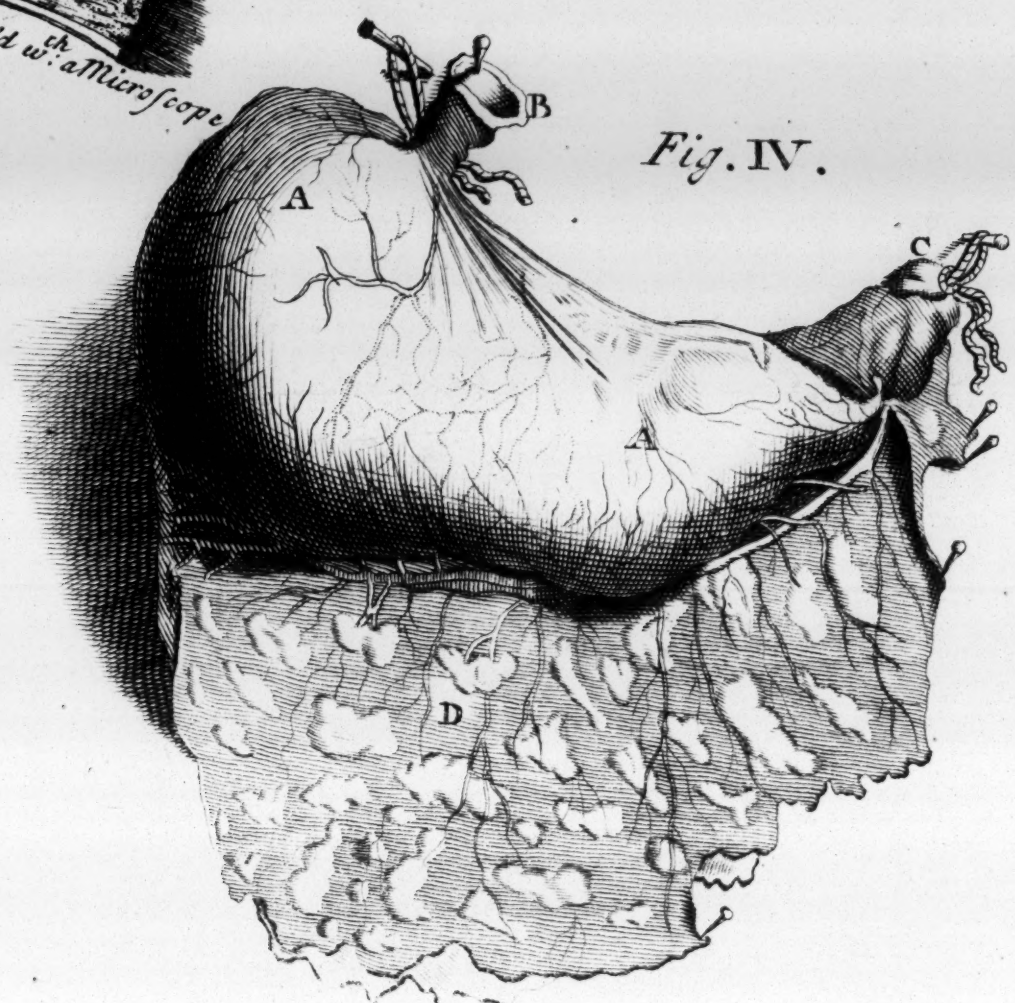
Fig. III.



of y^e Belly after y^e Stomach Guts &c are remov'd.

a slice of y^e Gall Bladder view'd w^th a Microscope

Fig. IV.



y^e Stomach revers'd.

Tab. II.

Fig. I. *The Caul of a young Dog.*

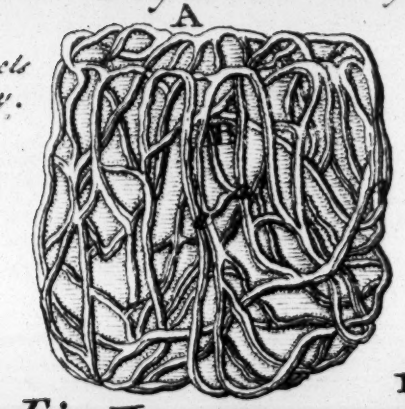
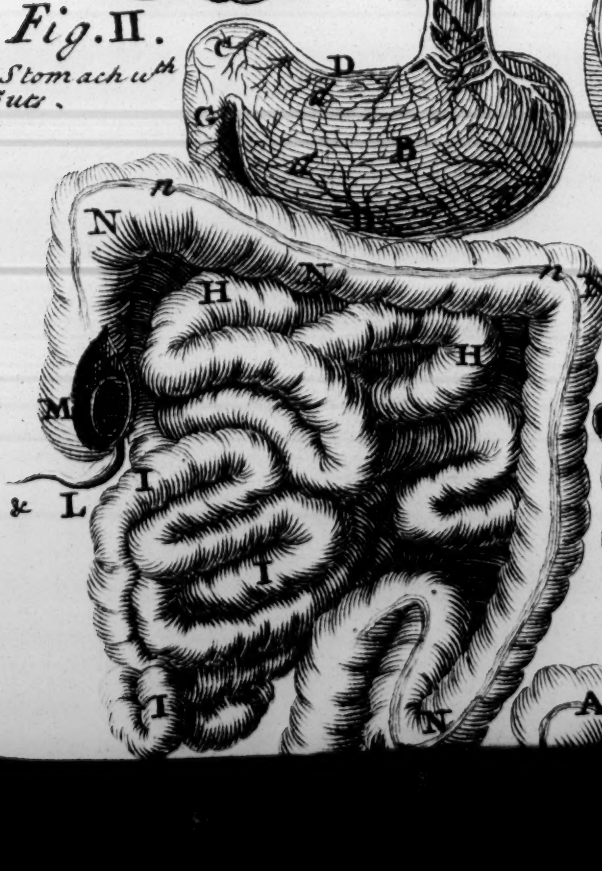
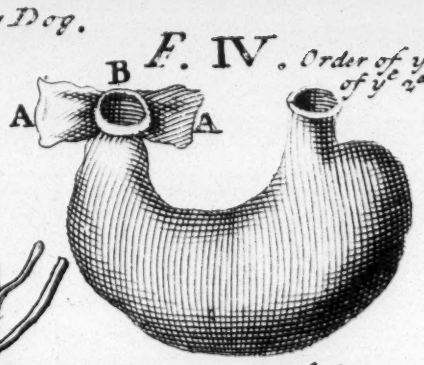


Fig. II.

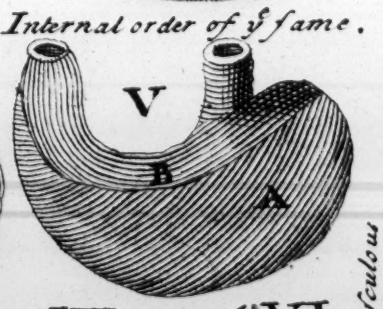
Stomach w^th Guts.



F. IV. *Order of y^e Fibres of y^e 2^d Coat.*



Internal order of y^e same.

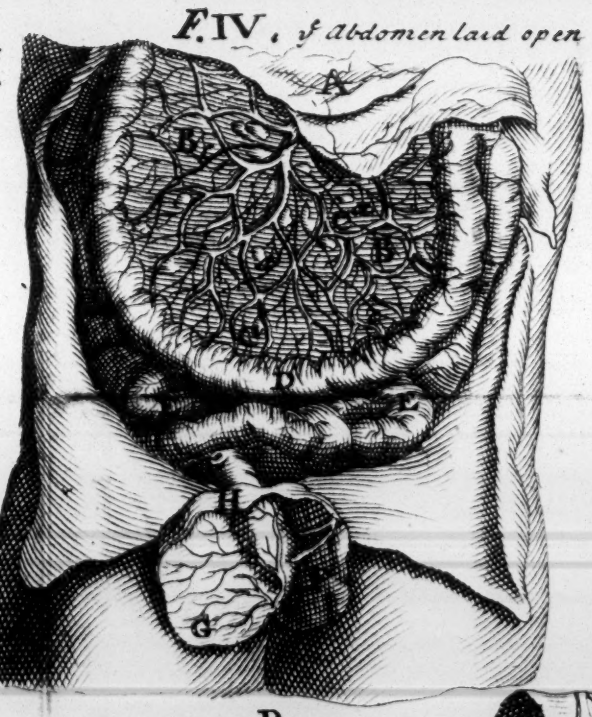


VII. *of y^e G^s* VI. *part of y^e Vesculous Coat.*

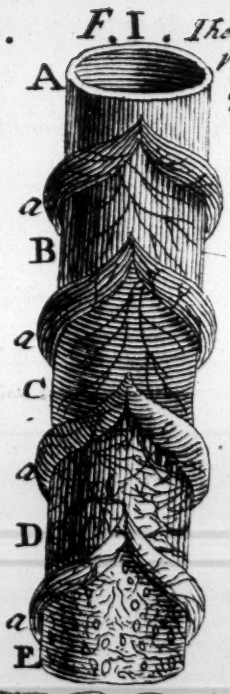
VIII *y^e Stomach inverted to shew y^e Folds.*

Tab. III.

F. IV. *y^e Abdomen laid open.*

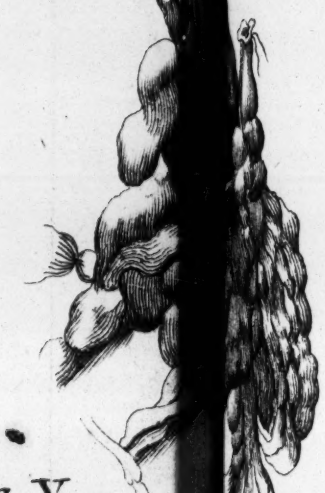


F. I. *The Tunicles & Valves of y^e Guts.*



F. II. *part of y^e Jejunum laid open.*

y^e Abdomen open'd to shew its Viscera .



y^e Cavity of y^e Belly
are remo

Tab. IV.

Fig. I . *The hollow part of y^e Liver revers'd .*

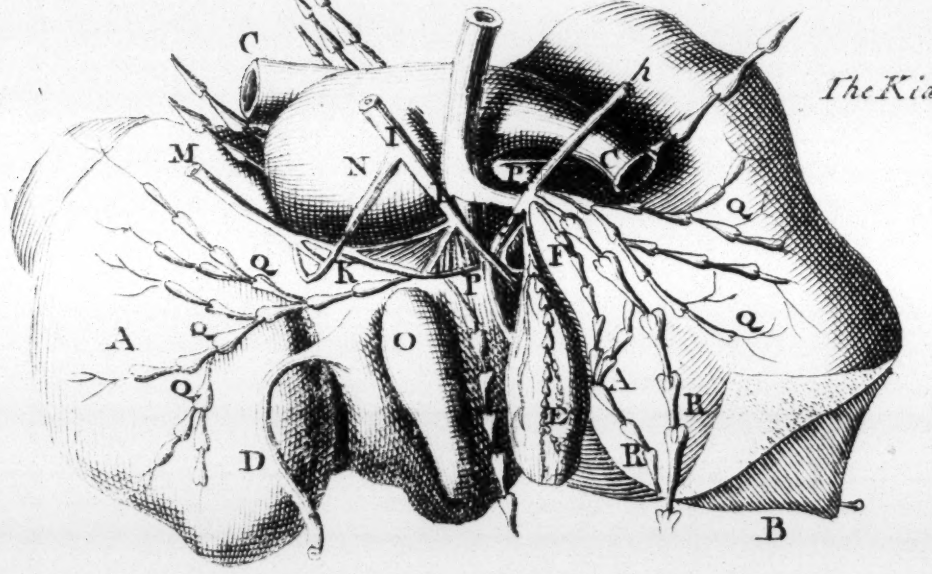


Fig. V.

The Kidney dissected

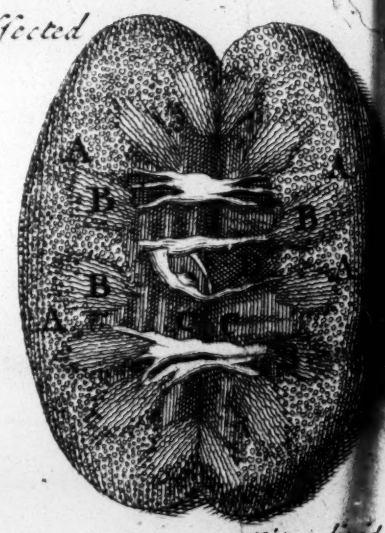


Fig. VI . *The Vessels of y^e Kidney.*

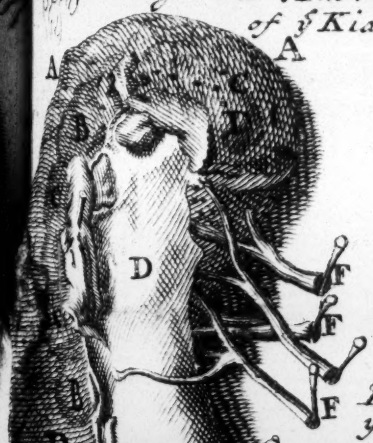


Fig. I
The Stomach
y^e Guts .

Fig. VII . *The whole Kidney divided*

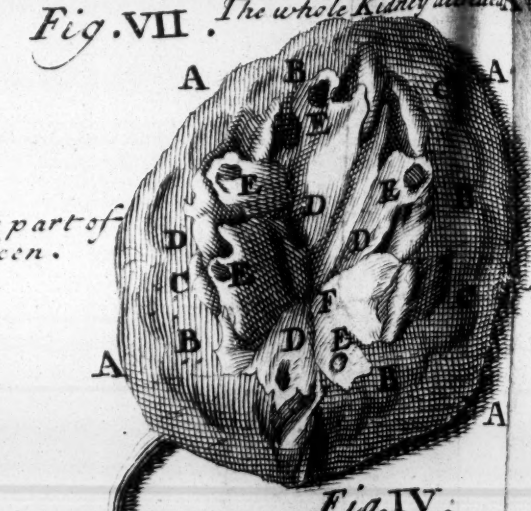


Fig. III . *Trunk of y^e great Artery & Vena Cava .*

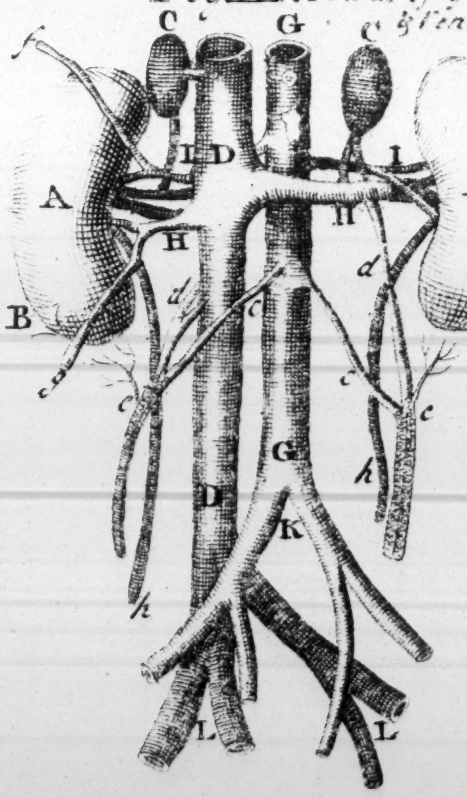


Fig. II .
The concave part of y^e Spleen .

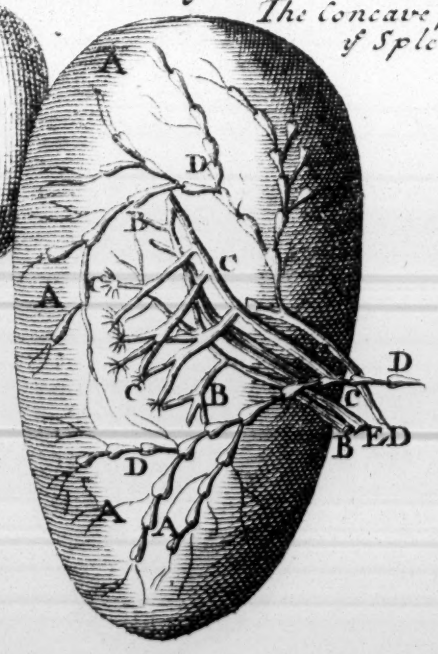
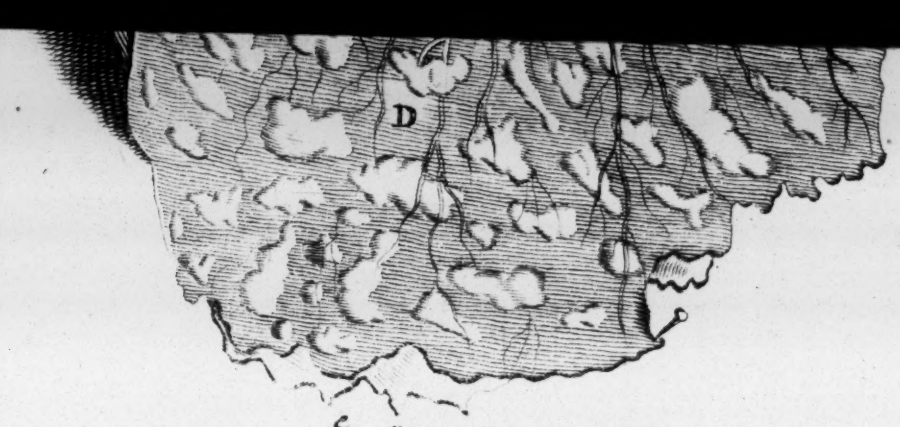


Fig. VIII .
The Blood Vessels & Urinary Tubes expres'd .

Fig. IV .

part of y^e Liver beild & viewd thro' a Microscope.

of ye Belly after ye Stomach Guts &c are remov'd.

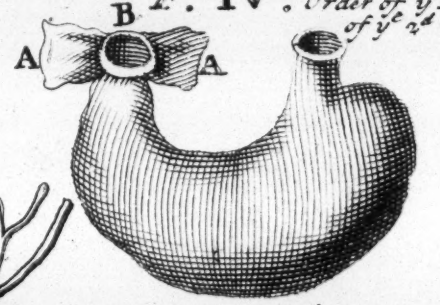


ye Stomach revers'd.

Tab. II.

Fig. I. The Caul of a young Dog.

F. IV. Order of ye Fibres of ye 4th Coat.



Internal order of ye same.

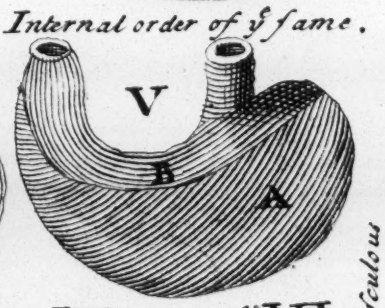
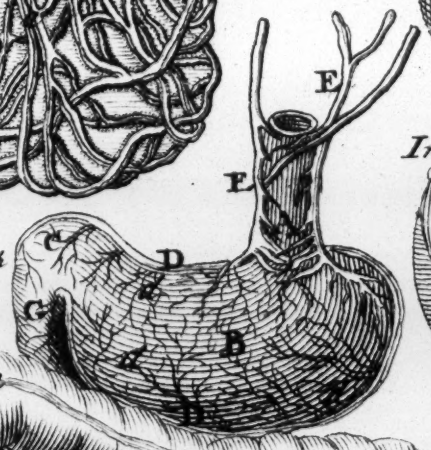
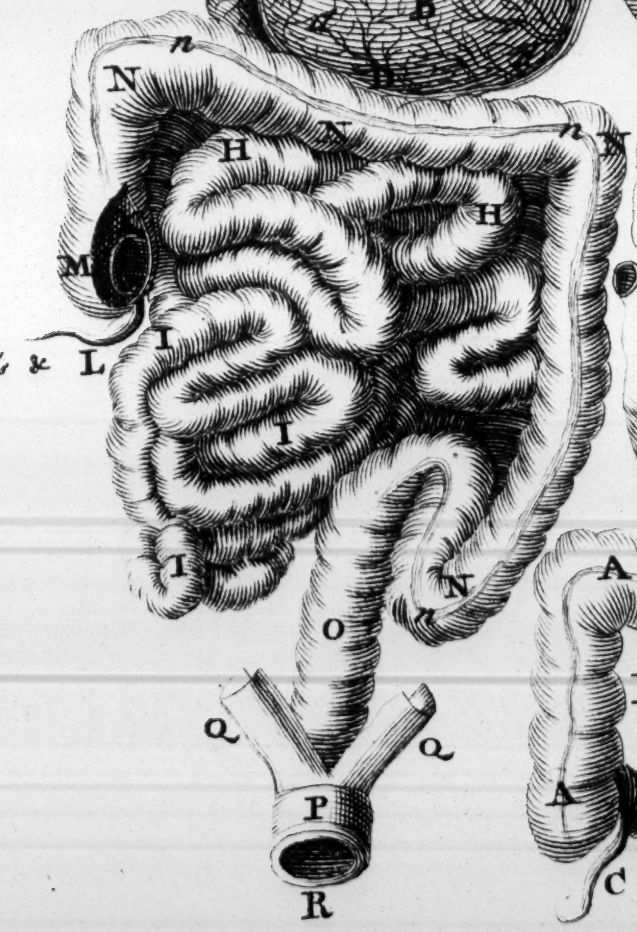


Fig. II.

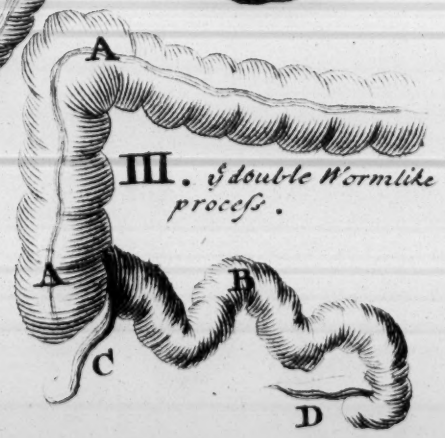


the Stomach with Guts.



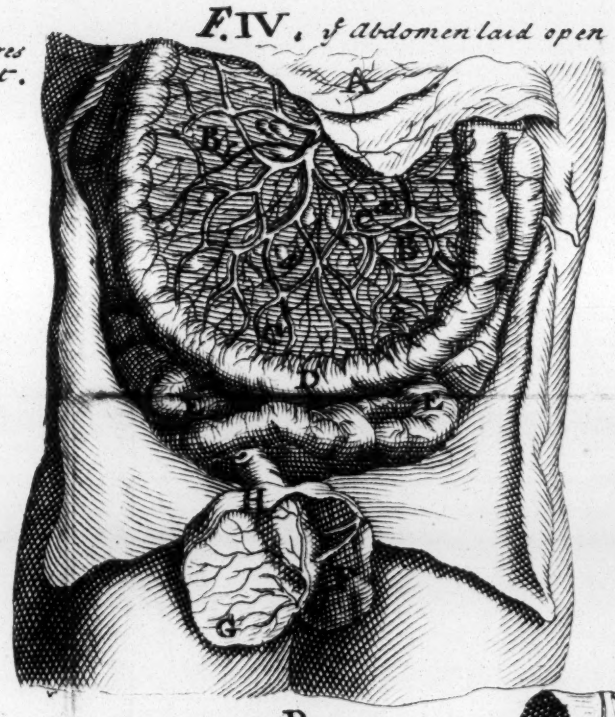
VII. of ye 4th VI. pare of ye Vasculous Coat.

VIII ye Stomach inverted to shew ye Folds.

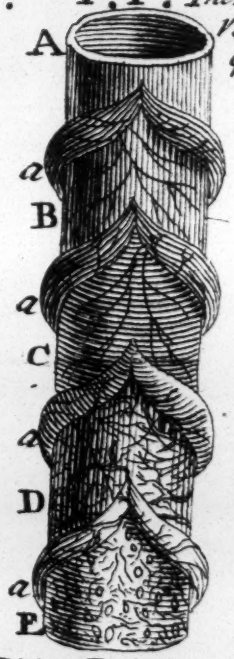


Tab. III.

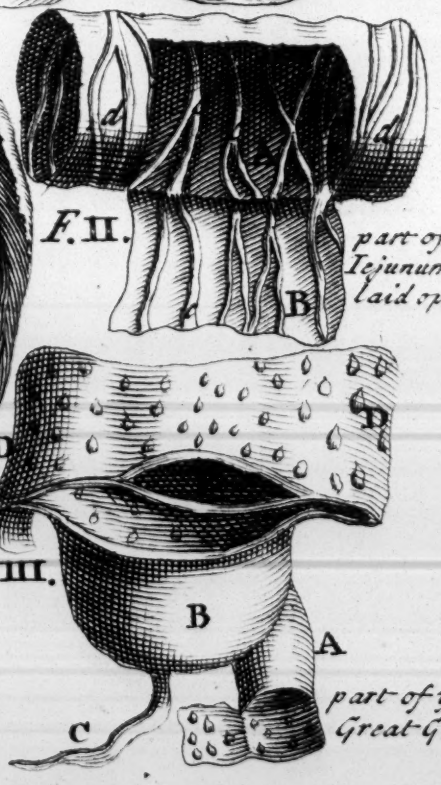
F. IV. ye Abdomen laid open.



F. I. The Tunicles & Valves of ye Gut.



F. V. The Mesentery wth ye Guts.



F. II. part of ye Jejunum laid open.

F. III. part of ye Great Gut.

d. The *Ductus Cyſticus.*
e. The *Ductus Hepaticus* joining with the *Cyſticus*, and making the *Ductus Communis.*
f. A Probe inſerted into the *Ductus Pancreaticus.*
g. Another Probe in the ſame Orifice or Caruncle in the *Duodenum g.* inſerted into the *Ductus Communis Bilarius.*
h. The Body of the *Pancreas.*
i. A Portion of the *Duodenum* open'd, to ſhew the *Exit* of the Bilary and Pancreatick Ducts, as above at *d*, *e*.
k. The Emulgent Veſſels of the Left Side, under which, and near the great Artery at *l*. lies the *Receptaculum Chyli.*
k, *k*. The two Kidneys, of which the Right is ſomewhat lower than the Left.
l. The Spleen.
l. The Deſcending Trunk of the great Artery.
m. The Aſcending Trunk of the *Vena Cava.*
n, *n*. The two Spermatick Arteries ſpringing from the Trunk of the Artery at *l*.
o, *o*. The two Spermatick Veins, the Right emptying it ſelf into the *Vena Cava m.* the Left into the Emulgent Vein *h.*
p, *p*. The Spermatick Veins and Arteries paſſing on the *Pſoas* Muſcles towards the *Teſtes.*
q, *q*, *q*. The two Ureters deſcending from the Kidneys to *r*.
r. The Bladder of Urine here blown up.
s. The *Urachus* turn'd down.
t, *t*. The *Vaſa Deferentia* paſſing from each Teſticle to the *Veſiculæ Seminales.*
u, *u*. The Proceſſes of the *Peritonæum* covering the Spermatick Veſſels as they paſs to the *Teſtes.*
w, *w*. The *Teſtes.*
†, †. The two Cremaſter Muſcles.
+, +. The *Glandulæ Inguinales.*
x, *x*. The Spines of the *Oſſa Ilea.*
y. The *Os Pubis*, where the *Ligamentum Suſpenſorium Penis* ſprings, here expreſs'd.
z. The *Dorſum Penis.*
D, *D*. The Cartilaginous Endings of the Ribs.
E, *E*. The Bony Parts of the Ribs.
F. The Cartilage.
G. The *Sternum.*

Fig. IV. *Shews the Stomach revers'd. From* Bidloo.

A, *A*. The *Fundus* or Bottom of the Stomach.
B. The lower Part of the *Gula* or *Oeſophagus.*
C. The *Pylorus* or Right Orifice, here repreſented the Left.
D. The *Omentum* or Caul hanging down, which lies on the Guts.

N. B. In this Figure, the ſuperior and inferior Coronary Blood Veſſels of the Stomach are very well expreſs'd, the lower parting with Slips to the *Omentum* as well as to the Stomach.

TAB. II.

Fig. I. *The Caul of a young Dog, with the Veſſels ſufficiently apparent, that are cover'd by reaſon of ſo much Fat in Men. From* Phil. Verheyen.

A. The poſterior *Lamella* of the Caul.
B. The fore Part.
a, *a*, *a*. The Veins and Arteries.

Fig. II. *The Stomach, with the Guts adjoining. From the ſame Author.*

A. The Left Orifice.
B. The Bottom of the Stomach.
C. The Right Orifice or *Pylorus.*
D. The Coronary Veſſels of the Stomach.
d, d. The Ramifications or Branchings of the ſame.
E, E. The Nerves of the Stomach.
G. Part of the *Duodenum.*
H. The *Jejunum.*
I. The *Ileum.*
K. The Valve of the Orifice of the *Ileum* viſible in the Gut when open'd.
L. The Worm-like Proceſs.
M. The Blind Gut.
N. The *Colon.*
n, n. Its Ligament.
O. The Straight Gut.
P. The Sphincter Muſcle.
Q. The Levators of the *Anus.*
R. The *Anus* in View.

Fig. III. *The double Worm-like Proceſs.*

A. The *Colon.*
B. The *Ileum.*
C. The common Worm-like Proceſs.
D. The extraordinary Proceſs.

Fig. IV. *The external Order of the Fibres of the ſecond Tunicle of the Stomach.*

A. Part of the Inteſtine divided.
B. The Sphincter Muſcle of the Stomach or *Pylorus.*

Fig. V. *The internal Order of the Fibres of the ſecond Tunicle of the Stomach.*

A. The Fibres deſcending on the Right Side.
B. A ſmall Handful of longitudinal Fibres in the upper Region of the Stomach.

Fig. VI. *Part of the Vaſculous Tunicle.*

Fig. VII. *Part of the Glandulous Tunicle.*

Fig. VIII. *The Stomach inverted, ſo that the Wrinkles and Folds may appear within.*

TAB. III.

Fig. I. *Shows the Tunicles, Glands and Valves of the Inteſtines, their Connexion with the Meſentery, the Meſentery it ſelf, with the Blood Veſſels and Glands. From the ſame Author.*

A. The Membranous Tunicle.
B, C. The Muſculous Tunicle.
B. The external Order of the Fibres.
C. The internal Order.
D. Th

D. The Vaſculous Tunicle.
E. The Glandulous Tunicle.

a, a. The ſuperior Tunicles turn'd back, that the inferior may reſpectively appear.

Fig. II. *Part of the* Jejunum *laid open.*

A. The Hollow of the *Jejunum.*
B. Part of the ſame Gut turn'd back.

c, c. The Folds or Valves of the ſame.
d, d. The ſame Folds outwardly tranſparent.

Fig. III. *Part of the great Gut as well as the ſmall.*

A. Part of the Gut *Ileum.*
B. The Blind Gut.
C. The Worm-like Proceſs.
D. Part of the *Colon* laid open.
E. The Orifice of the *Ileum* opening into the great Gut.

d, d. The Glands in the *Ileum.*
e, e. The Glands in the *Colon.*
f, f. The great Valve before the Orifice of the *Ileum.*

Fig. IV. *The* Abdomen *laid open; in which are ſeen,*

A. The Side Part of the Caul roll'd upwards.
B, B. Part of the Meſentery very much ſtretch'd, in which the Membrane drawn with the external Fat appears plain.
C, C. The Meſaraick Veins and Arteries leading to the Inteſtines.
a, a. The Glands of the Meſentery diſtributed about.
c, c. The Nerves in the black Lines, that they may be better diſtinguiſh'd from the reſt.
D. Part of the *Jejunum* tied to the Meſentery, plentifully ſupply'd with Blood Veſſels.
E, E. The reſt of the ſmall Guts.
F. Part of the *Scrotum* laid open cloſe to the Thigh.
G. The *Septum* of the Cod turn'd back to the Right Side.
H. One Diviſion of the exterior Part of the Cod, that joins to the *Septum.*

Fig. V. *The Meſentery, with the Guts,* &c.

A, B. The *Meſaræum.*
C, D, E. The *Meſocolon.*
A. The *Planum* of the *Meſaræum* hid by reaſon of the Fat.
B, B. Its Circumference tied together by many Foldings.
a, a. The Glands of the Meſentery.
b, b. The Blood Veſſels appearing very obſcurely from their Fat and Emptineſs.

TAB. IV.

Fig. I. *The hollow Part of the Liver revers'd. From* Bartholin.

A, A. The lower Side or concave Part of the Liver.
B. Its external Membrane ſeparated and hanging down.
C, C. The two Trunks of the *Vena Cava* near the gibbous Part of the Liver.
D. The Umbilical Vein turn'd into a Ligament.

E. The Gall-Bladder, on which a Lymphæduct is expreſs'd.
Near *F.* The *Ductus Cyſticus* of the Gall-Bladder is expreſs'd.
g. The *Ductus Hepaticus.*
h. The common Gall-Duct.
I. One of the Arteries of the Liver.
K. The Branch which comes from the Cæliack Artery.
L. The Branch of the Artery which goes to the Gall-Bladder.
M. The Nerve from the *Intercoſtalis.*
N. A ſmall Lobe of the Liver, to which the Caul is annex'd.
O. Another Lobe or Eminence, call'd of the *Portæ.*
P. A Lymphatick Gland.
Q, Q. The Lymphæducts ariſing out of Liver, which are here expreſs'd very lar not being done after the Life.
R, R. Other Glands ariſing out of Gland *P, P.* into which the former were inſerted, which convey the *Lympha* immediately from thence into the *Sacculus Cyli. N. B.* This Progreſs of Lymphæducts is true in Nature, though it is here done from Invention.

A, A, A. Fig. II. *The concave Part of the Spleen. From* Veſlingius. *With the Addition of the Lymphæducts.*

B. The Splenick Artery.
C, C. The *Vena Porta.*
D, D. The Lymphatick Veſſels, with their Valves.
E. The Intercoſtal Nerves.

Fig. III. *Shows the Trunk of the Great Artery and the* Vena Cava. *From* Veſlingius, *&c.*

A, A. The Right and Left Kidney in their proper Places.
B. Its Trunk ſeparated and hanging down.
C, C. The *Glandulæ Renales.*
D, D. The Trunk of the *Vena Cava.*
G, G. The Trunk of the Great Artery.
H, H. The Emulgent Veins.
I, I. The Emulgent Arteries.
c, c. The Arteries of the Teſticles.
d, d. The Veins of the Teſticles.
e, e. The Spermatick Blood Veſſels, as they paſs to the Teſticles, in one common Covering of the *Peritonæum.*
f. The *Arteria Adipoſa.*
g. The *Vena Adipoſa.*
h, h. The Ureters.
K, K. A Branching of the Arteries going towards the Thighs.
L, L. A Branching of the *Vena Cava* the ſame Way.

Fig. IV. *Repreſents Part of the Liver boil'd, and view'd through a Microſcope. From* Bidloo.

A, A. The external Tunick of the Liver rais'd.
B, B, B, B. The Glands that compoſe the Liver.
C. The Fibrous and Membranous Connexion of theſe Bunches of Glands.
D, E. The Sanguinary and Biliary Veſſels diſtributed to the Glands.

Fig. V. *Shows the Kidney diſſected from the gibbous Part to the* Pelvis.

A, A, A. The Glandulous *Acini* diſpers'd through the Kidneys.

B, B, B. The Urinous Pipes, which convey the Urine from the Glandulous *Acini* into the *Pelvis*.

C. The *Pelvis*.

D. The Mouth of the Ureter.

Fig. VI. *Shows the Veſſels of the Kidneys*, Pelvis, *and Urinous Ducts. From* Bidloo.

A, A, A, A. One half of the Kidney diſſected from the other.

B, B, B. Urinary Pipes going from the Glandulous *Acini* to the *Pelvis*.

C, C, C, C. The Glandulous *Acini*.

D. The *Pelvis*.

E. The Ureter.

F, F, F. The Emulgent Veſſels.

Fig. VII. *The whole Kidney divided from its gibbous Part to the* Pelvis, *and diſplay'd. From the ſame Author.*

A, A, A, A. The Kidney diſſected.

B. The Urinary Pipes.

C, C. The Glands which compoſe the external Surface of the Kidney.

D. The *Pelvis*.

E, E, E, E. The Places where the Urine comes out of the Glandulous Pipes into the *Pelvis*, call'd the *Carunculæ*.

F. The Way out of the *Pelvis* into the *Ureter*.

G. The *Ureter* paſſing down.

Fig. VIII. *The Blood Veſſels and Urinary Tubes of the Kidney expreſs'd from a Microſcope. From the ſame Author.*

A. The proper Membrane of the Kidney.

B, B. The Ends of the Blood Veſſels broke off.

C. The Blood Veſſels of the Kidney, which help to compoſe its Glands.

D, D. The Glands of the Kidney, compos'd of Blood Veſſels, Urinary Tubes, Nerves and Lymphæducts.

E. The Urinary Tubes in their Way from the Glands to the *Papillæ*.

F. The Urinary Tubes cut off, which paſs'd to the Glands beyond thoſe here expreſs'd.

G. The *Carunculæ* or Papillary Body fram'd by meeting of the Urinary Tubes.

H. A Branch of the *Pelvis* cut off, which receives the Urine from the Tubes of the *Caruncula*.

Of

Of the Peritonæum *or Rim of the Belly, and its Parts. From* Verheyen, St. Hilaire, *and other the moſt modern and accurate Anatomiſts.*

THE Muſcles of the *Abdomen* remov'd, the *Peritonæum* diſplays it ſelf, which is a thin, ſoft, ſmooth Membrane, covering and containing all the *Viſcera* of the Lower Belly, as you may ſee in *Tab. I. Fig. II.* at *A.* and *B.* Its Figure or Shape in the natural State correſponds to that of the *Abdomen*, and makes a Kind of irregular Oval. It is every where double, but more plainly ſo from the Navel to the *Os Pubis*, where likewiſe in Women it is thicker for the Conveniency of Diſtention in the Time of going with Child. Its external Surface is ſomewhat rough and fibrous from its Connexion with the Muſcles; but the internal is exactly ſmooth, and lin'd with an unctuous Humour, to facilitate the ſliding of the Inteſtines along it, which is ſeparated by a Number of ſmall Glands, that in Dropſical Bodies grow larger and more viſible, as the Membranes themſelves grow likewiſe thicker.

The Connexion of the *Peritonæum* on the Outſide is to the tranſverſe Muſcles of the *Abdomen* and *Linea Alba*, on the upper Part to the Diaphragm, below to the *Os Pubis* and *Iſchium*, on the Side to the *Os Ilii*, behind to the *Os Sacrum* and *Vertebræ Lumbares*, eſpecially the firſt and third, from which it is ſaid by many to have its Origine, and where likewiſe the Duplicature is again very viſible, not only upon the Account of its remarkable Thickneſs, but from its ſpontaneous Parting to receive the Kidneys betwixt the *Laminæ*. It is alſo reflected from the inferior Surface of the Diaphragm to the ſuperior or convex Surface of the Liver, which it ſuſpends, and this Part of it is call'd *Ligamentum Suſpenſorium Hepatis.*

The exterior Coat has two Proceſſes in Men, falling down into the *Scrotum*, wrapping up the Spermatick Veſſels, which they are likewiſe dilated, and make the *Tunica Vaginalis* of the *Teſtes*. In Women, they form an *Involucrum* for the round Ligament of the Womb. Ignorant Surgeons, not knowing preciſely where theſe Proceſſes are the Perforations of the *Obliqui Deſcendentes*, ſometimes miſtake Ruptures for Tumours of another Kind, and attempt Suppuration that might be fatal if proſecuted; and ſometimes on the other Hand, they put Truſſes upon Apoſtemations, that ought to be open'd. This Membrane receives Arteries and Veins in the upper Part from the *Mammariæ* and *Diaphragmaticæ*, and on each Side from the *Lumbares*. The Nerves come out of the *Os Sacrum* and the Loins.

Olaus Rudbeck pretends to have diſcover'd Lymphaticks in it, which are ſeldom mention'd by Authors, becauſe ſeldom viſible but in Hydropical Caſes, and therefore not often ſeen. In morbid Caſes, great Quantities of *Serum* have often been found between the Duplicatures of this Membrane, when there has been none beneath it in the Cavity of the *Abdomen*. This is the true *Tympany*, and is frequent in Women whoſe *Ovaria* are probably in ſuch Caſes firſt affected, though all other Parts be ſound.

According to the common Opinion, the Tunicle of the Liver, the external one of the Stomach and Guts, are produc'd from the *Peritonæum*. Beſides, it ſuſtains the Muſcles of the *Abdomen*, and aſſiſts the Expulſion of the *Fæces*; but the moſt conſiderable Uſe for which it ſeems to be particularly made, is to contain and keep in their Place the *Viſcera* and Inteſtines of the Belly, which

hich is ſo manifeſt, that whenever the *Peritonæum* happens to be broken or extraordinarily dilated, ſome of them are very apt to fall out of their Place, and to form thoſe ſorts of Tumours which are call'd from the parts diſplac'd *Enterocele* and *Epiplocele*; and thoſe are again divided according to the parts they fall upon; as a Rupture of the Guts falling upon the Navel is call'd *Omphalocele*, which is an Accident that happens frequently to Children, ſometimes to Women upon hard Labours or often bearing of Children, and is commonly ſeen in Dogs, who, from the Horizontal Poſition of their Bodies, have a greater Weight and Bearing of the Inteſtines upon that Part than any other of their Body. The next is the *Bubonocele*, which is the falling down of the Inteſtines through the Perforation of the *Muſculus Obliquus Deſcendens*. In the *Scrotum*, ſuch a Deſcent of the Inteſtines or the Caul being the moſt uſual Kind of Rupture, is call'd *Enterocele* or *Epiplocele*, or from both together *Entero-Epiplocele*.

All theſe Sorts of Ruptures are occaſion'd by Blows, violent Concuſſions, Over-ſtretching in Vomiting, hard Labour, or Wind, from which latter Cauſe it is that Ruptures are ſo frequent in Children, and ſo eaſily help'd by timely Care. There are other Tumours which from their outward Appearance are alſo vulgarly call'd Ruptures: But theſe relating to the common and proper Teguments of the *Teſtes*, ſhall be ſpoken of when we come to treat of the Genital Parts.

Having open'd the *Peritonæum*, we come to the Parts contain'd in the *Abdomen*, which are, the Umbilical Veſſels, the Umbilical Vein, the two Arteries, and the *Urachus*, the three firſt of which are ſoon after the Birth dry'd or ſhrunk up into a Ligament. See *Tab. I. Fig. II.* at *a*, *b*, *c*. But the *Urachus* is a Part that is never perforable in Man. Amongſt the Contents of the *Abdomen*, the Guts poſſeſs the largeſt Space, the greateſt Part of which are hid under the *Omentum* or Caul, as may be ſeen in *Tab. I. Fig. IV.* the Letter *D*.

The *Omentum*, otherwiſe call'd *Rete vel Reticulum*, and by the *Greeks Epiploon*, or the Caul, is a fine membranous Part, that is fill'd with Fat, and is directly ſpread over the Guts with a double Fold, the upper Parts of both which are join'd to the Stomach and Guts, and the lower Parts hang free. It ſeems to be call'd *Omentum quaſi Operimentum*, becauſe it aſſiſts the Guts; and *Rete*, from the Likeneſs it bears to an artificial Net, being wove or made up of Blood Veſſels, delicate Membranes, and little Cells of Fat, which interſecting one another, divide into a Multitude of little *Areolæ* reſembling the Maſhes of a Fiſhing-Net. The Weight of the Caul is uſually about a Pound in Adults, though *Veſalius* relates he ſaw one of five Pounds Weight. There are a great Number of Veſſels interwoven throughout the Subſtance of this Part. The Nerves are from the Intercoſtal Branch of the eighth Pair, ſeveral Arteries from the Cæliack and Meſenterick, and Veins from the *Porta*, eſpecially the *Splenick Branch*. They are call'd the Epiploick Veins and Arteries; but becauſe ſome of them are as it were common to the Ventricle and Caul, they are call'd *Gaſtro-Epiploicæ*. There are likewiſe a great many little Glands, which are not without their proper Uſes; but the chief Uſe of this, acoording to *Verheyen*, is to promote the Motion of the *Inteſtines*, as being properly form'd to accommodate the different Changes from the Fulneſs or Emptineſs in the *Periſtaltick Motion* of the Guts; and it is not unlikely that the Fat of this Part nouriſhes and warms the Bowels, as well as they ſerve to convey the Splenick Branch, and other Veſſels, to the *Stomach*, *Duodenum*, and *Colon*, for their Nutrition.

Of the Gullet *and* Stomach. *From* Peyerus, M pighius, Verheyen, St. Hilaire, Valſalva, &

THough the *Oeſophagus*, *Gula*, or Gullet, properly belongs to another Part of the Body, yet being the Conveyance to the Stomach, I thought it might not be improper to conſider it in this Place. It is a membranous Pipe, deſcending from the Mouth to the Stomach between the *Aſpera Arteria* and the *Vertebræ* of the Neck and Back in a ſtraight Line, except a little Deflexion about the fifth *Vertebra* of the *Thorax*, where it turns ſomewhat towards the Right, to make Way for the great Artery which runs along with it to the ninth *Vertebra*, where turning again towards the laſt, it croſſes over the Artery, and piercing the *Diaphragm*, ends at the Left Orifice of the Stomach. It conſiſts of ſeveral Coats or Membranes. The firſt is deſign'd only for a Covering to the reſt, like the *Membrana Muſculorum propria*: The ſecond Coat is Muſcular, conſiſting of ſtrong fleſhy Fibres, like other Muſcles, ſo that it ſeems to make the *Gula* a hollow fiſtulous Muſcle. According to *Steno* and *Willis*, it conſiſts of two Orders of Fibres, going from Top to Bottom in *Spiral Lines*, contrary to, and decuſſating each other. This Deſcription of thoſe two great Men before-mention'd is very exact of the *Gullet* of *Ruminants*, but not ſo of that of Men; and it is probable, they fell into this Error by examining the *Oeſophagus* of Brutes only, and thence concluding too haſtily, that the Structure was the ſame in Humane Bodies.

In Men, this Coat conſiſts of two fleſhy *Lamellæ*, like two diſtinct Muſcles; the outward being compos'd of ſtraight longitudinal Fibres, which in the Deſcent of the *Oeſophagus* growing narrower, not far from the *Pharynx*, approach one another nearer, and are implanted into the Parts underneath. The inner Order of Fibres is *Annular*, without any obſervable Angles. The Uſe of this Coat, and theſe Orders of Fibres, promote Deglutition, of which the longitudinal, when in Contraction, ſhorten Gullet, and ſo make its Capacity larger admit of the Matter to be ſwallowed. *Annular* on the contrary in their A contract the Capacity, and cloſing be the deſcending Aliment, preſs it downwa ſo that theſe two Orders of Fibres ſeem be Antagoniſt Muſcles to one another, by different Actions both conſpire to ſame End, *viz.* the Protruſion of the A ment.

The next Coat, which is call'd the *Vaſcular*, conſiſts of a double Membrane; outward form'd of irregular Fibres and numerable Veſſels interwoven, from whe it is call'd the *Vaſcular*. The *inner T* conſiſts of ſtraight longitudinal Fibres, ſo what fleſhy, mix'd with Abundance of tle Glands, from whence it has been eſteem a diſtinct Coat, and is call'd the Glandulous. This Membrane adheres firmly to t within it, which is call'd the *Nervous C* and is extremely fine, made up of exceſſ ſlender Fibres variouſly diſpos'd. This C is lin'd inwardly with a villous Cruſt, whi is not reckon'd among the *Tunicks*, whi I look upon to be the excretory Ducts the Glands, and not unlike the *Cuticula* the *Cutis*, to ſerve to defend the ſubja Membrane. In caſe of Excoriations by ſh Humours, it has ſometimes been brought at the Mouth, when the upper Orifice the Stomach has been clos'd by Tumour which Caſe ſeems to differ only in the C cumſtances of the Part affected, and the W of Evacuations from the like Excretions *Dyſenteries*. This Membrane ſo caſt up d not ill reſemble the *Cuticula*, as it appe when rais'd by Veſication, and perhaps th is as near a Reſemblance between the N ture of their Cauſes, as to the Kind a

Deg

egree of their Acrimony, both proceeding m volatile Animal Salts, though one be ternal, and artificially procur'd, the other ternal, and ſpontaneous or fortuitous.

The upper Opening of the *Oeſophagus*, uated at the Bottom of the *Fauces*, is cal- d *Pharynx*, which is aſſiſted by, or rather ppos'd of, three Muſcles: The firſt is lled *Stylopharyngæum*, and ariſes round and eſhy from the *Proceſſus Styloides*, and in its blique Deſcent becomes thicker, and after- ards is expanded on the back Parts of the auces, between the double Series of Fibres f the following Muſcles. Theſe, when hey act, draw up and dilate the *Pharynx*. The *Pterygopharyngæum* ariſes from the *Pro- eſſus Pterygoides*, where the *Muſculus Ptery- goſtaphilinus* is reflected. This Muſcle ſerves ot only to conſtringe the *Pharynx*, but likewiſe to compreſs the Tonſils, and force out their *Mucus*; upon which Force it is likewiſe employ'd in promoting Hawking. *Valſalva*, who has lately given us a new Account of the Muſcles of theſe Parts, de- nies the Exiſtence of this Part of this Muſ- cle which ſprings from the *Proceſſus Ptery- goides*, which however is conſtantly and re- gularly found. The ſame Author has like- wiſe of two other Parts of this Muſcle, long ſince deſcrib'd and figur'd by Mr. *Cow- per*, made two diſtinct Muſcles, and given them two new Names: The Part ſpringing from the Tongue he calls *Gloſſopharingæus*, and the other Part immediately below it, *Hypopharingæus*.

The various Originations of the ſeveral Parts of this Muſcle have caus'd it to be ge- nerally divided into ſeveral Muſcles, whence come the *Cephalopharyngæus* and *Sphænopharyn- gæus*, which, as thoſe of *Valſalva* before- mention'd, are only Parts of various Origi- nations which concur in forming this Muſ- cle. The *Oeſophagiæus*, which is generally reckon'd a circular Muſcle, is ſtrictly no more than a Production of the foregoing Muſcle, whoſe Fibres ſurrounding the *Pha- rynx*, form a Tendinous Line on the back Part of it; but it being connected on each Side to the *Cartilago Thyroides*, has been thought to ariſe from thence, and is by *Ver- heyen* taken for a Pair of Muſcles conſpiring to form a Sort of *Sphincter* by their Concur- rence. It cloſes the *Gula*, and helps to thruſt down the Aliment when enter'd, in which Action it is aſſiſted by the Muſculous Coat of the *Gullet*, which by ſome is reckon'd among the proper Muſcles, and call'd *Muſ- culus Vaginalis Gulæ*, already deſcrib'd among the Coats.

To the End of the *Oeſophagus* adjoins the Stomach, which lies immediately under the *Diaphragm*, and is partly cover'd on the Right Side by the Liver, and on the Left lies upon the Spleen. It is a *membranous* Part, hollow like a Bag, and ſhap'd like a Bagpipe, ſituated in the Left *Hypochondrium* as a proper Veſſel for the Reception of Meat and Drink, which afterwards it turns into Chyle. It has two Orifices, the Gullet, which is the upper, and the *Pylorus*, the lower Orifice, both which have been ſpoke of already.

The inferior Orifice or *Pylorus* is continu'd to the *Duodenum*, being narrower than the ſuperior, which Structure is given to it to hinder the Aliment from paſſing too preci- pitately out of the Stomach before it be ſuf- ficiently diſſolv'd: For this Reaſon likewiſe it is furniſh'd with an extraordinary Series of Fibres, which ſerve to bind and contract it more than any other Part of the Stomach, which running circularly round it, ſerve as a Kind of *Sphincter*, which is open'd by the Contraction of the Stomach, and by the Appulſe of the Chyle. At the Bottom of the *Pylorus* is a large Cavity, which *Willis* calls the *Antrum, in quod Maſſæ Chylaceæ Por- tio magis elaborata ſecedere & inibi manere que- at, donec Pars crudior, ut nuperius ingeſta, in Ventriculi Fundo plus digeratur*; wherein he aſſigns to it the Office of keeping the firſt digeſted Chyle, till that which was later ta- ken into the Stomach be digeſted: But if it be true, as *Wharton* obſerves, that there are *Venæ Lacteæ* in the Bottom of the Stomach, ſuch a Proviſion ſeems unneceſſary, and the moſt fluid Part of the Chyle has then ano- ther Paſſage; but the Exiſtence of theſe is diſputed.

The Size of the Stomach is various, but largeſt uſually on the Left Side. The Coats are reckon'd to be Three, the inner of which is cover'd with a mucous ſpongy Lining, like very fine Hair, which is nothing but the excretory Ducts of the Glands. The exterior is that common one which is de-

riv'd from the *Peritonæum*. This Coat is every where very thin about the Orifices, and at the Bottom it is much thicker, and furniſh'd with Fibres ſomewhat like *muſcular*, and as if they ſerv'd for Motion. The ſecond or muſcular Coat conſiſts of thick fleſhy Fibres, of two Orders, inward and outward, and are ſo diſpos'd as to interſect each other on all Parts of the Stomach at Right Angles. The inward run obliquely towards the Left upon the upper Part of the Ventricle. In this outward Order or *Lamina* upon the upper Part of the Stomach, is a remarkable Parcel or *Faſciculus* of Fibres, which paſs from the Left Orifice longitudinally, and terminate in the Right, entring the *Antrum* of the *Pylorus*. The Office of this Coat is to conſtringe the Stomach, and drive its Contents towards the *Pylorus*; as likewiſe, by the Joint Action of its Fibres of both Orders, to make the *Periſtaltick* or *Vermicular Motion*, which begins at the Left Orifice of the Stomach, and is continued through the whole Tract of the Inteſtines, as may be ſeen in all live Diſſections. In this Motion, the longitudinal Fibres ſeem to have the leaſt Share, and rather ſerve as Antagoniſts to the reſt, in their Contraction, by approximating the two Orifices of the Stomach, which hinder the too haſty Expulſion of the Contents.

The third Coat is nervous, and conſiſts of Fibres variouſly interwoven with numerous Blood Veſſels and Glands. This *Tunick* ſerves for Senſe, and by the pricking of ſome Humours upon this Coat, *Appetite* or the Senſe of Hunger is ſuppos'd to be rais'd. Its Glands likewiſe may contribute ſomething towards that Quantity of mucous Humour which is found in the Stomach. The *Cruſta Villoſa* is by ſome Authors reckon'd a fourth *Tunick*, and perhaps not unjuſtly. On the inner Surface of this are to be ſeen innumerable *Villi* or fine *Fibrillæ* riſing perpendicularly every where out of it, which ſome will have to ſerve for nothing but a Defenſative to the Stomach, to preſerve it from acrimonious Humours: But I think them to be the *excretory Ducts* to the ſubjacent Glands, which many Authors would have to be that now exploded Thing call'd a *Parenchyma*, but are indeed the Organs by which moſt of that Humour which is diſcharg'd upon the Stomach is ſeparat and theſe *Villi* the immediate Channel th which it is convey'd.

The inner Surface of the Stomach, wh it is not diſtended by the Contents, is f of *Wrinkles* and *Folds* made by the *Nerv Coat* and *Cruſta Villoſa*, which being coext ded to the muſcular Coat in its utmoſt D ſtention, and not contractile as that is, mu when that is in its Contraction, lie th folded and wrinkled; but in hard Dr kers, and in Stomachs uſually diſtend with Flatulencies, the Tone of the muſcu Coat being deſtroy'd, the inner ones lie pla and even with it. By the Means of th *Plicæ*, the nervous Coat, which is not co tractile, but yet extremely ſenſible, is pr ſerv'd from being painfully ſtretch'd wh the Stomach is diſtended. Some will lik wiſe have them to ſerve to be a Stop or Check to the ſliding of the Aliments too ſoon out of the *Stomach*; but this ſeems not a gennine Uſe of it, becauſe when the *Stomach* is at its full Diſtention, which ſhould be the neceſſary Time of checking, the Surface is then more plain; and when the Stomach is quite empty, and there can be none of that Uſe, the Corrugations are then greateſt.

Gliſſon and *Willis*, and after them moſt Anatomiſts, have thought they ſerv'd likewiſe, and that paincipally too, to ſtop and keep a Reſerve or Stock of old Chyle, which they thought by the Stay in the Stomach to be exalted into a Kind of Ferment, which ſerv'd not only to ſtimulate the Coats of the Stomach, and to excite Appetite, but alſo as a *Menſtruum* to ferment and diſſolve the future Aliment. I ſhall leave this Opinion to be diſcuſs'd more largely hereafter. The Veſſels of the Stomach are very numerous. Its Arteries come from the Branches of the *Cæliack* both Right and Left, and call'd the *Gaſtricks*. Its Veins go to the *Porta*, ſome immediately into the Trunk, ſome into the *Splenick* Branch. The firſt call'd the Right *Gaſtricks*, and the other the Left. To theſe comes another Vein, which runs along the whole Length and with its Roots embraces almoſt the whole *Ventricle* whence it ſprings, and therefore call'd the *Coronary*. It ſends likewiſe ſome Branches which join

the Splenick Branch at the Spleen, which are by Anatomiſts call'd the *Vas Breve*, but ſhould more properly be call'd *Vaſa Brevia*, becauſe of their Number. Through thoſe Veſſels the Ancients thought that a melancholick Humour was convey'd from the Spleen to the Stomach, which ſerv'd the Membranes of it, and to excite the Appetite: But this Fancy is refuted by the Diſcovery of the Circulation of the Blood, which has demonſtrated, that nothing comes through thoſe Veſſels from the Spleen to the Stomach; but that on the contrary, Blood is convey'd from the Stomach into the *Splenick Vein*, and by that to the *Vena Porta*.

Its *Nerves* are conſiderable both for Number and Magnitude, and come from the Trunks of the *Par vagum*, which deſcending along the *Oeſophagus*, are divided into two Branches, internal and external, of which the internal joining again together from one Trunk, which falls down along the *Oeſophagus* to the Outſide of the Left Orifice of the Stomach, and from thence ſpreads it ſelf all over the Bottom of the Stomach. The external Branches likewiſe joining a little lower, deſcend to the inner Side of the ſame Orifice, and from thence diffuſe themſelves over all the upper Part of the Stomach. It receives likewiſe ſome Branches from the *Plexus* form'd in the *Abdomen* near the Stomach by the Branches of the ſame *Nerve*, which is call'd the *Plexus Cardiacus*. The external Surface of it is plentifully cover'd with *Lymphaticks*, which diſcharge themſelves into the Receptacle of the Chyle. By reaſon of the great Concourſe of Nerves, there ſometimes happen great Pains about the Left Orifice of the Stomach, call'd the *Heart-Burn* or *Cardialgia*, that commonly draws along with it a *Deliquium* of the Spirits, occaſion'd by the Communication betwixt theſe and the Nerves of the Heart. As to what relates to the Chyle, and the Fermentation and Digeſtion of the Stomach, we ſhall leave that till we come to treat of the Fluids of the Body.

Of the Inteſtines. *From* Malpighius, Verheyen, *&c.*

THE *Inteſtines*, which ſeem to be nothing but a Continuation of the Stomach, conſiſting of the ſame Number of Coats, fabricated in the ſame Manner, are protended with various Circumvolutions and Inflexions to the *Anus*, through which they diſcharge the excrementitious Part of their Contents out of the Body. They are defin'd by Mr. *St. Hilaire* to be long, membranous, hollow, round, winding Bodies, extended from the Stomach to the *Anus*, and allotted to make and contain the Chyle and Excrements. See *Tab. III. Fig. I.* taken from *Ph. Verheyen*, *Let. G*, *H*, *I*, *M*, *N*, *O*.

They are, when ſeparated from the Mezentery, to which they are all along connected, of a very great Length, ordinarily about ſix times as long as the Perſons whoſe they were; and though they ſeem to be but one continu'd Channel or *Fiſtula*, yet becauſe in ſeveral Parts their Size, Shape and Thickneſs are different, they are generally divided into ſix Guts of two Sorts, *viz.* thick and thin; and have all of them in common a Kind of Vermicular Motion, which beginning at the Stomach, is propagated downwards, and call'd the Periſtaltick Motion.

The firſt of the thin Guts is call'd the *Duodenum*, and reaches from the Right Orifice of the Stomach as far as the *Vertebræ* of the Back on the Left Side, where, at the firſt Angle made by the *Inteſtines*, it ends, which is about twelve Inches, from which Meaſure it ſeems to have taken its Name. This Meaſure however is very far from being correct, as being too largely computed. Into this Gut the *Gall-Duct* and *Pancreatick Duct* empty themſelves, and their ſeveral Liquors mix with the Chyle.

The next Inteſtine is the *Jejunum*, ſo called, becauſe it is generally found more empty than the reſt, which may be occaſion'd, partly by the Fluidity of the Chyle, which is greater in this Inteſtine than in any of thoſe that follow it; and partly by its Capacity, being ſomewhat larger than that of the *Duodenum*; and therefore it gives a freer Paſſage: And perhaps alſo the Irritation of this Gut, through the Acrimony of this Bile, which is diſcharg'd upon the Inteſtines a little before the Beginning of this Gut, may contribute ſomething towards accelerating the Paſſage of the Contents. However, it may ſeem ſufficient to ſome, that through the great Number of Lacteals, with which this Gut abounds more than any other, the Deſcent of the Contents here ſtrip'd of the moſt fluid Parts, ſhould in the reſt be more ſluggiſh, by reaſon of their greater Conſiſtence. This Inteſtine is allow'd to poſſeſs almoſt the whole Umbilical Region, and its Length is generally computed to be about twelve or thirteen Hands Breadth.

The *Ileum*, which is the third Inteſtine, is ſituated below the Navel, and fills the *Ilea* with its numerous Folds and Convolutions. It is the longeſt of all the Inteſtines, being eſteem'd to be one and twenty Hands long; but theſe Eſtimates are ſomewhat arbitrary, becauſe it is not exactly ſettled among Anatomiſts, where the *Jejunum* ends, or the *Ileum* begins; neither is it eaſy or neceſſary to do it. In both this and the preceding Gut, the inner Tunicle is much wrinkled, the looſe Folds of which have been thought to do in ſome Meaſure the Office of Valves, and have therefore by Authors been call'd *Valvulæ Conniventes*, which are framed, as in the Stomach, only by the inner Coat being larger than the outward.

Next to this follow the thick Guts, the firſt of which is call'd the *Cæcum*, which has a lateral Inſertion into the upper End of the *Colon*, and is not perforated at its other Extremity, but hangs to it like the Finger of a Glove, and is about three or four Inches long. The true Uſe of this Part is not yet determin'd; and ſome late Anatomiſts have thought that the Name likewiſe is miſtaken, not allowing this to be the Blind Gut of the Ancients, which they imagin'd to be that thick globous Part of the *Colon* that is immediately appended to the *Ileum*; and th
fore they have given this Part the Nam
Appendicula Vermiformis: But this is a
pute not worth a wiſe Man's employing
Thoughts about, therefore I ſhall pu
it no further. This *Cæcum* or *Appendi*
proportionably bigger in Children tha
grown Perſons, and in many other Ani
than in Men, and is at the unperforate
blind Extremity ſlightly connected or kn
the Right Kidney.

The next of the thick *Inteſtines* is the
lon, which is much the largeſt and moſt
pacious of them all. It begins at the *Cæ*
and is with that connected to the R
Kidney; thence with a winding Cour
proceeds towards the Liver, where it is ſo
times tied to the Gall-Bladder, and by
ting'd with Yellow. From the Liver it ru
a-croſs under the Bottom of the Stom
where it is by fine thin Membranes faſt
to the Spleen, and marches over the left Kid
ney, where its Cavity is ſometimes ver
much ſtraightned, and deſcending ſo to th
Bottom of the *Os Ilium*, and from thence re
turning to the upper Part of the *Os Sacrum*
and there making the Figure of a *Circumflex*
it ends in the *Rectum*. At the Entrance o
the *Ileum* into this Gut, is plac'd a *Valv*
form'd out of the Production of the inwa
Coat of the *Ileum*, which, like the Finger
a Glove when its Extremity is cut off, han
looſe in the Cavity of the *Colon*, by whi
Means it ſtops the Return of the Excrem
though ſometimes, as in Inverſions of th
Periſtaltick Motion, it proves not ſuffici
for that Uſe. It has a great many *Cell*
or as it were diſtinct Cavities, fram'd by
Coarctation of the Gut by two Ligament
Bundles of membranous fleſhy Fibres, ab
half a Finger broad, each running on
Side the Gut, oppoſite to each other,
whole Length of it, and as it were gir
it in at certain Diſtances, thereby maki
reſemble a Glaſs *Incorporator*, us'd to mix
and Vinegar.

The next and laſt of the *Inteſtines* is
Rectum or *Straight Gut*, which reaches f
the *Os Sacrum* to the *Anus*, and is p
without Cells. It is faſt tied to the
Sacrum and *Coccygis*, by Means of the *Pe*
næum, and in Men to the Neck of the B
der of Urine, in Women to the *Vagina*

to which it is ſtrongly join'd by a membranous Subſtance, that Subſtance of the *Vagina* and the *Inteſtine* being hardly diſtinguiſhable from one another. The Length of this Gut is ordinarily about a Hand's Breadth and a half, and its Capacity about three Fingers Thickneſs, the lower End of which, to wit, the *Anus*, being furniſh'd with three Muſcles.

The firſt of theſe is a circular Muſcle, ſerving to ſhut the *Anus*, and keep the Excrements from coming away involuntarily, and is call'd the *Sphincter Ani*. It is near two Inches broad, and hangs down below the Inteſtine it ſelf near an Inch. It is faſten'd on the Sides to the Bones of the *Coxendix*, and behind to the *Os Sacrum*; on the fore Part in Men to the *Muſculus Accelerator Urinæ*, in Women to the *Vagina Uteri*. Some would make this two Muſcles, and ſome three; but that Diſtinction ſeems not very inſtructive, and perhaps not well grounded, and therefore as ſuch I ſhall lay it aſide. The two other Muſcles are call'd the *Levatores Ani*, and have their Riſe on each Side from the inner lateral Part of the *Iſchium*, and in the *Sphincter* before deſcrib'd. Theſe ſerve to retract or pull back the *Sphincter* after the Expulſion of the Excrements, which, eſpecially after hard Stools, is apt to be too far protruded, and to need the Aſſiſtance of theſe Muſcles to reduce it. Mr. *Couper*, in his *Myotomia Reformata*, ſays, that in their Progreſs to the *Anus*, they on both Sides paſs cloſe over the *Proſtatæ*, which they compreſs *in Coitu*, as they alſo do the *Veſiculæ Seminales*, and oblige thoſe Parts to void their Contents into the *Urethra*, in which Action the *Diaphragm* and Muſcles of the Belly cooperate.

The Tunicks or Tunicles of the Inteſtines are the ſame in Number as the Membranes of the Stomach; neither are their Structure much different from them, ſays *Verheyen*, except that they are ſmaller; and the Fibres of them are much diſpoſed after the ſame Manner in the ſecond Tunicle as they are in the ſecond Tunicle of the Stomach. The firſt and external Tunicle of the Guts is the fineſt, which is produced from the *Peritonæum*. The ſecond Tunicle is thicker and more fleſhy. There are two Orders of the moving Fibres of this, one lying under the other. The longitudinal Fibres of the external Order are convey'd through the whole Tract of the Guts: The internal are *Annular*, which ſurround the Gut. The Office of theſe *Annular* Fibres is to bind the Guts with their Contraction, and ſo to effect the *Periſtaltick* or *Vermicular* Motion, by the Action of which their Contents are excluded. The third Tunicle, commonly call'd the innermoſt, and by *Willis* the nervous, is made up of all Sorts of Fibres, and contains in it ſelf the Extremities of the nervous as well as ſanguineous Veſſels. This firſt of all tends to Senſation, and, according to the various Impreſſions made upon it by the Progreſſion of the Matter, vellicates the carneous Tunicle to a quicker or ſlower Secretion.

This nervous Tunicle, after the ſame Manner as the third Tunicle of the Stomach, yields a villous Cruſt, and according to *Willis*, *propter eoſdem uti videtur Uſus, videlicet hæc Vaſorum Ora obtegit actatatur, inſuper & Chyli aliorumque Contentorum primos Appulſus ſuſtinet, eaque deinde Tunicæ nerveæ paulatim tradit.* This Cruſt, equally with that of the Ventricle, hardens by immerſing in hot Water, and the Membrane appears by it ſelf pretty thick and diſtinct; and its exterior Superficies, according to the ſame *Willis*, abounds ſufficiently with a Plenty of Glands.

There are farther to be conſider'd in the Inteſtines a great Number of Glands, which in the *Inteſtina Tenuia* are gather'd together in Heap, as it were like Bunches of Grapes. In theſe Inteſtines they are very ſmall, and were it not for their Coacervation, ſcarce remarkable: But in the *Inteſtina Craſſa* they are much larger, not gather'd like the others, but diſpers'd, and (though very numerous) come under the Denomination of *Solitary Glands*. Theſe Glands diſcharge a Liquor into the *Inteſtines*, whether ordinarily for any Thing more than the *Lubrication* of the *Inteſtines*, and diluting their Contents, I will not determine; though the greateſt Part of the Diſcharge ſeems to be made through which, either upon extraordinary Fluxes, or upon the Adminiſtration of *Catharticks*, we have frequent Occaſion to obſerve.

Theſe Guts in general are furniſh'd with Blood from the Meſenterick Arteries, which is renew'd by the Meſaraick Veins; but the *Duodenum* receives a Branch of an Artery from

from the *Cæliack*, which is call'd *Duodena*, to which anſwers a Vein of the ſame Name, that likewiſe returns the Blood to the *Porta*. Theſe Veſſels ſpread the Inteſtines with Abundance of Ramifications, and are frequently diverſify'd in ſeveral Subjects of the ſame *Species*, much leſs are they to be depended upon for an uniform Appearance in Animals of a different Kind. The Inteſtines have Nerves for Motion and Senſe, partly from the Stomach, but chiefly from the great *Meſenterick Plexus*, which diſtributing Rays about its Center like the Sun am the Planets, tranſmits its Branches e where to the Inteſtines; but theſe Ne are only appointed for involuntary Acti But there are other Nerves provided for *Inteſtinum Rectum*, and alſo for Part of *Colon* adjoining to it, and theſe are Ner iſſuing out of the *Medulla* of the *Os Sacr* by whoſe Aſſiſtance we voluntarily prom the Excretion or Excluſion of the *Fæces*.

Of the Meſentery, Lacteals, Thoracick Duct, *&c.*
To which ſome Things are ſubjoin'd concerning the Lymphaticks *of the* Abdomen. *Taken from* Verheyen, Bartholin, Aſellius, Wharton, Tulpius, Veſlingius, Rudbeck, Pecquet, Van Horne, Ruyſch, Bidloo, *&c.*

THE *Meſentery*, ſo call'd becauſe it lies in the Midſt of the Guts, is a membranous Part, very much extended, tying together the Inteſtines, and conſiſts of ſeveral Membranes, Nerves, Arteries and Veins both Sanguineous and Lacteal, together with Fat and Glands, as may be ſeen in *Tab. III. Fig. IV. B, B.* As the Inteſtines are of two Kinds, ſo the *Meſentery* is: One Part adhering to the ſmall Guts, is call'd the *Meſeræum*; and the other to the great Guts, is nam'd *Meſocolon*; the one Part being thick, the other thin, correſponding to the Inteſtines. The *Meſentery* takes its Riſe from the firſt and third *Vertebræ* of the Loins, where ſeveral Fibres ariſing from the *Peritonæum*, are wove into two ſtrong Membranes, which join'd together, chiefly conſtitute the *Meſentery*. To theſe two Membranes ariſing from the *Peritonæum*, *Wharton* adds a third, thicker than either of the former, which he calls *Meſenterii Proprium*; and ſays, he obſerv'd it in a Maid of forty Years of Age, that was emaciated with a Diſeaſe; and ſuch a Membran as this *Verheyen* acknowledges, and ſays, it is an adipoſe Membrane fill'd with many fa Bags; for the Membrane is apt to be fat i Men as well as in ſeveral Cattle, but i Dogs the Fat is only apt to lie upon th Veins and Arteries.

The Shape of the *Meſentery* is circular, ſo that the uſual Proportion of the Diamet compared to the Circumference of the Circl is here much wanting, becauſe that in th Circumference of the *Meſentery*, there ar great many Wrinkles or Foldings, that, i proceeding towards its Center, are by De grees loſt; ſo that the Diameter of the *Me ſentery* is ſcarce two Handfuls broad in Man of a middle Stature, and yet the Ci cumference ſhall extend to ſome Ells. O the Sides it is oblong, eſpecially on the Le where it falls upon the *Inteſtinum Rectu* The Veſſels are the ſame as deſcrib'd in th Inteſtines; but this is obſervable in the *Me ſentery* concerning the Veins and Arter that they firſt of all entring fewer, a

ence diſtributing more, but leſſer Bran-
es, before they enter the Subſtance of the
teſtines, unite again in ſeveral Places, and
rming as it were ſeveral Segments of a
ircle through almoſt the whole Length of
e Guts, make a numerous, or rather in-
merable, Quantity of Branches, tranſmit-
g them to the Inteſtinal Canal. Thoſe
gments are more perfect in Dogs, though
ey are not wanting in Men, in which or-
narily concurring, they form as it were
veral Iſlands. See *Tab. III. Fig. IV. c, c.*

There are ſeveral Glands interſperſed a-
ongſt the Membranes of the *Meſentery*,
hich are ſoft and friable, much whiter in
outh than in Age, when they become yel-
w, and are ſometimes obſcure. Theſe
lands in a Humane Subject lie diſpers'd
mongſt the Fat, whoſe Number and Size
e very uncertain. In Dogs, about the
enter of the *Meſentery* lies a great Gland,
all'd by *Aſellius* the *Pancreas*, into which
ll the Lacteals riſing from the Guts run.
Men, there is none found that is call'd
e great Gland of the *Meſentery*, but there
e ſeveral leſſer Glands obſervable in that
art. *Tab. III. Fig. IV.* and *V. a, a.*

There are many various Opinions con-
erning the Uſe of theſe Glands; but after
ll, they ſeem to be chiefly, if not entirely,
ram'd and appropriated to the Service of
he Lacteals: Notwithſtanding ſome have
uppos'd they had a peculiar Uſe for ſecern-
ng the urinous Matter at once from the
hyle, directly conveying it from thence to
he Kidneys, and ſo to the Bladder, without
o long a Courſe round as to be carried to
he Emulgent Arteries by a tedious Circula-
ion. But ſince nothing of this can be de-
monſtrated, it is better and more rational to
uppoſe, theſe Glands ſerve to tranſcolate a
ertain Humour that dilutes the groſſer
hyle, and conſequently renders it more fit
or Motion, eſpecially through ſuch narrow
Channels, where nothing but a very thin
luid would be able to paſs. Hence the
Uſe of the *Meſentery* will appear the clearer,
hich ſeems to be deſign'd, 1. To connect
he Guts together into a narrow Compaſs;
. To convey the Arteries, Veins, Nerves
nd Lacteals, to the Guts, and back again;
. For the Aſſiſtance of the Glands, to fur-
niſh out a peculiar Humour to dilute the
Chyle, and lubricate the Lacteal Veſſels.

The *Lacteals* are fine thin Veſſels as to their Subſtance, not much unlike the Lymphaticks, appointed to receive the Chyle from the Inteſtinal Duct, and to depoſite it in its proper Ciſtern. Theſe little Veſſels were diſcover'd and deſcrib'd firſt of all by *Gaſpar Aſellius* in the Year 1622. And *Eraſiſtratus*, amongſt the Ancients, ſaw them in Goats newly milk'd, but took them for Arterial Branches, that were fill'd with a Superfluity of Milk. They take their Origine from the Inteſtinal Duct, undoubtedly the internal Superficies of the nervous Tunicle, together with Abundance of Branches or fibrous Roots, which meeting here together, conſtitute the larger Veſſels; but whether the Lacteals are inſerted in the great Guts, ſeveral have doubted; but *Bartholin* affirms they are, notwithſtanding Experience does not confirm it. It may be more likely he ſaw, as *Verheyen* ſays, certain Veſſels ariſing out of the thick Guts that were turgid, with a limpid Humour, which he took for Lymphaticks of the Subſtance of the Inteſtines, but not proceeding from their Cavities, thoſe Inteſtines appearing rather to be meer Receptacles of the fæculent Matter, from which nothing can be had of Uſe to the Maſs of Blood and Fluids. Theſe larger Veſſels or *Lacteal Veins* terminate in a Ciſtern or common Receptacle of Chyle and *Lympha*, Part of which are call'd thoſe *of the firſt Kind*, to the great Gland; and from that to the Ciſtern, thoſe *of the ſecond Kind*. The Uſe of theſe is to receive a good Part of the Chyle, and convey it through the *Meſentery* to the *Ciſtern*.

But all theſe Lacteals diſappear at the Inſtant of Death, though they have been induſtriouſly ſought after in ſeveral Brutes, there are no Track or Footſteps of them remain to the naked Eye: Therefore the great Difficulty aroſe of diſcovering them in Humane Bodies, and till of late Years the moſt eminent Anatomiſts have own'd they never ſaw them, though they doubted not at all but they were equally exiſting in Men as well as Beaſts. *Bartholin*, *Tulpius*, *Highmore*, and ſome others, acknowledge, that they have expreſs'd the Chyle or Milky Humour

out

out of the Veſſels of a Humane Subject, but that they could never ſee their Egreſs or Coming out of the Guts, or their Progreſs or Courſe towards the Ciſtern, which are ſo viſible in a Dog, Sheep or Calf, upon live Diſſections; the Method of diſcovering which being ſo commonly taught in every Anatomical Piece of modern Writing, it may appear needleſs to inſiſt on it. The Lacteal Veſſels being much diſtended by a Ligature, their Valves will eaſily become viſible, yet neither ſo plain, or ſo many of them, as in thoſe Veſſels that are properly *Lymphæducts*. Since it is certain that the Lacteals receive the Chyle from the Cavity or inward Part of the Guts, it is very wonderful, that they ſhould neither receive Wind, or any Humour that might preſs into them after Death from the ſuperior Parts, when the lower were bound up, notwithſtanding the natural Heat yet remaining there: But indeed there are ſome Parts ſtrangely expanded in Life, that are ſhut very cloſe after Death; yet, ſays *Verheyen*, this Change can never ariſe from hence; but the Orifices of the ſaid Veſſels he ſuppoſes are open'd in Life by the Periſtaltick Motion, ſo that the Chylous Matter may eaſily enter.

From the Lacteal Veins we ſhall proceed, together with the *Chyle*, to the Ciſtern or Receptacle of the *Chyle* and *Lympha* brought from the inferior and neighbouring Parts, which in Dogs, and other perfect Animals, lies towards the Deſcending Trunk of the *Aorta*, under the Left Emulgent Vein and Artery; thence turning back a little, it proceeds forward to the Hollow of the *Thorax* or Breaſt. It is form'd of a thin or ſlender Membrane, the breaking of which ought to be taken Care of from the *Peritonæum* lying upon it. Its Extenſion is various, according to the different Size or Voraciouſneſs of the Animals. The Length correſponds to a fourth Part of the *Thoracick Duct*. The Breadth, ſuch as in larger Dogs, may contain a little Finger; but the Coat or Tunicle thereof will dilate it ſelf extremely, inſomuch that it may be blown up as big as a Hen's Egg. This Duct of the Ciſtern is continued all along the Trunk of the *Thorax*, till it ends in the Vein, call'd in Men. *Subclavia*, in Quadrupeds the *Crural*, and in ſome the *Axillary*. This Duct is call'd, from its Situation, *Thoracick*; from what it conta the *Chyliferous* Duct; and by *Bilſius*, fro peculiar Opinion of his, the *Roriferous*. has likewiſe had the Name of *Pecquet*'s D or Receptacle, from his Diſcovery of it; it was long before, as *Wharton* atteſts, t this Duct was taken Notice of by that c brated Anatomiſt *Bartholomæus Euſtachius*, his Book *de Vena ſine Pari*, publiſh'd at *nice*, 1564. from whence *Wharton* takes following Words: *Itaque in illis Animant (de Equis videtur loqui) ab hoc ipſo in Trunco ſiniſtro, qua poſterior Sedes Radicis V jugularis internæ ſpectat, magna quædam Pr go germinat, quæ præterquam quod in ejus C gine (Inſertione ſcilicet) Oſtiolum circumci lare habet; eſt etiam alba (a Chylo) & a Humoris (lymphatici) plena, nec longe ab tu in duas Partes ſcinditur (Biſurcatio) p poſt rurſus coeuntes in unam, quæ nullos R diffundens juxta ſiniſtrum Vertebrarum L Penetratio ſepto tranſverſo deorſum, ad Me uſque Lumborum fertur, quo Loco latior (Ci na) affecta, magnamque Arteriam circumpl obſcuriſſimum Finem, mihique adhuc non perceptum, obtinet.* This Deſcription ag exactly with the *Thoracick* Duct and Ciſtern but that the Order is inverted, he beginn at the Inſertion of the Duct into the *Subcla* This Duct and Ciſtern is of the ſame S ſtance, but three times as narrow. For Secur it has three *Lamellæ* of the Membrane of *Pleura* to cover it. Part of the *Thora Duct* relating to the *Abdomen*, uſually lie the Side of the Deſcending Trunk of *Aorta*, whoſe Intercoſtal Branches climb tranſverſly. In Dogs, about the third P and ſometimes about the Midway, they divided into two Branches, and in a Space inoſculate or join again, and form Duct, and then bend their Courſe dire to the *Crural* Vein.

But to dwell no longer here, we proceed to the Conſideration of the Inſer of the Duct into the Vein, and the V plac'd upon its Orifice, which, that may appear the plainer, the Vein is to open'd lengthways, and from thence bou ſo that preſſing the Duct towards the V we may take Notice of the Eruption of *Chyle* and *Lympha* into the Vein. Blow will ſupply the Defects on both Sides; the injecting of Liquor by a Syringe into

Thoracick Duct into the Ciſtern is much the beſt Way. This is to be obſerv'd, that the Liquor once thrown into that Duct cannot return again, it being impeded or ſtop'd there by the Valves plac'd in the ſaid Duct.

Some diſpute, whether in Man every ſingle Lacteal do not enter into ſo many particular Glands of the *Meſentery*, as in a Dog they all enter the great Gland or *Pancreas*. *Verheyen* is of the Affirmative, becauſe (ſays he) they either receive ſomething from the Lacteals, or infuſe ſomething in them, the latter of which ſeems the moſt likely; though the *Thoracick* Duct or Ciſtern is not directly diſcoverable in Men, though *Bartholin* found three Lumbar Glands, and ſuppos'd there might be more which ſupply'd the Place of the Ciſtern. *Duæ majores* (ſays that Author) *ſibi invicem impoſitæ, & mutuis Ramis lacteis conjunctæ, locantur inter Cavam deſcendentem & dextram in Angulo, quam Emulgentes cum Cava faciunt. Tertia ſuperior* Diaphragma *propinque accedit, ejuſque Principio nerveo ſub Appendice immergitur.* Addit, *Solæ hæ Glandulæ in Hominibus ſufficiunt, quia voraces eſſe non debent Canum inſtar, &c.* It is believ'd notwithſtanding, *Bartholin* was deceiv'd, and took the Lymphatick Veſſels for Lacteals, as are ſeen in Dogs paſſing from the Glands of the *Abdomen*; for there appears no Reaſon why the *Ciſtern* in a Dog or Cat, made like a Bag, which has a pretty large Cavity, ſhould in Men be without any remarkable Cavity at all; from whence *Bartholin* draws his Lacteal Branches from thoſe Glands reaching to the Right Emulgent Artery, which has no Appearance: But it is plain, that the Lymphaticks iſſuing from the Kidney paſs through the Gland to the Kidney; yet it is very credible, that *Bartholin* had ſeen the *Thoracick* Duct, becauſe he made a Draught of that Duct, in which the ſaid Branches were implanted. But the *Lympha* in Brutes paſs from the lower to the upper Parts by the *Thoracick Duct*; therefore it may reaſonably be ſuppos'd, that it paſſes the ſame Way in Men: Therefore whoever from hence demonſtrates the Duct by which the *Lympha* paſſes directly to the Maſs of Blood, at the ſame Time demonſtrates the *Chyliferous* or *Thoracick Duct*. The Uſe of the *Ciſtern*, from what has been ſaid, is to receive the *Chyle* by the Lacteals and the *Lympha* from the lower Parts, and to tranſmit thoſe two Humours to the *Thoracick Duct*; from whence it follows, that the Uſe of the *Thoracick Duct* is to receive the *Chyle* and *Lympha* from the *Ciſtern*, likewiſe the *Lympha* from the Parts of the *Thorax* implanted to them by the *Lymphatick* Veſſels, and to convey thoſe Humours to the Vein, and ſo to the common Maſs of Blood.

But we ſhall next enquire, why certain *Lymphæducts* enter the Glands in their Paſſage. And firſt of all we may ſuppoſe, that they ſeparate in thoſe Glands ſome aqueous Humours towards moiſtening the neighbouring Parts, eſpecially about the Bendings or Joints of the Body; but that Humour muſt be ſecern'd from the *Lympha* brought thither by thoſe Veſſels: But it ſeems moſt reaſonable, that the Humour depoſited in thoſe Glands was brought thither by the Arteries with the Blood, as it is in other Parts of the Body; becauſe ſince the Maſs of Blood is compos'd of ſo many various and different Humours, hence it may eaſily be ſuppos'd, there are a Species of Glands proportion'd or made up of certain Pores or Paſſages; and ſince the Humours are driven on forcibly by the Arteries, it may eaſily happen, that that Separation is perform'd agreeable to the ſaid Species. And further, it is reaſonable, that the Lymphatick Veſſels ſhould paſs through the ſaid Glands, that from thence they might receive by other little Twigs or Branchings of the *Lymphæducts* a new *Lympha*, though thoſe Glands may not be peculiarly adapted to the Separation of that *Lympha*; but the Separation of this is only an Addition to the Separation of the principal Humour, as the Separation of the *Lympha* in the Liver is added to the Separation of the Bile. But of this more when we come to treat of the Fluids, deſign'd for the laſt Volume.

Of the Pancreas *or* Sweetbread. *From* De Graef, Wirtzungius, Wharton, *&c.*

THE *Pancreas* is a *Conglomerate Gland*, ſeated near the firſt *Vertebra* of the Loins, at the Bottom and hinder Part of the Stomach, adhering at its thicker End to the *Gut Duodenum*, and from thence extended towards the Spleen. It conſiſts of innumerable ſmall Glands, which, though ſeparately being very firm, cohere but looſely together, and therefore make the whole Body of it ſeem lax. Theſe Glands are colligated as well by the Veſſels, as by a Membrane proper to every one of them, and altogether are cloath'd with a very thin Membrane from the *Peritonæum*, which, if you blow into the excretory Duct of the *Pancreas*, will let out the Air at ſeveral Places. Its Colour is what we call Fleſh Colour, that is a White inclining to a Red.

The Shape of the *Pancreas* is almoſt like a Dog's Tongue, but in Proportion longer, being in Men of a middle Stature from eight to ten Fingers Breadth long, about two and a half broad, and one thick. Its Weight, according to *Wharton* and *De Graef*, is four or five Ounces. In Dogs, Cats, and ſome other Animals, it is as it were divided into two Parts; ſo that one Part runs croſs under the Stomach, the other deſcends along the Inteſtinal Duct by the *Meſentery*. Its Arteries come from the *Cæliack* both Right and Left; the Veins go to the *Porta*. About the Guts it receives little Twigs from the very Trunk of the Vein. The Nerves come from the *Hepatick Plexus*, which is form'd under the Liver of ſome Branches of the Intercoſtals.

The Lacteals or Chyle Veſſels in Dogs, run from the *Duodenum* by the *Pancreas* to the great Gland of the *Meſentery*; from whence it is very probable, that the Veſſels of the ſame alſo ſpread themſelves towards the *Ciſtern:* But thoſe, as the Lacteals or Chyle Ducts, do not belong to the *Pancreas*, neither ought they to be reckon'd among its Veſſels. But it may be doubted whether they are not the Lymphaticks of the *Pancreas*, though it is not to be diſputed, but that there are other Lymphatick Veſſels proper to the *Pancreas*, which receive *Lymph* directly from that, and pour it into the ſaid Lacteals.

Beſides this, it has a peculiar excretory Duct extended throughout its Length, which *George Wirtzungius* firſt found out in the Year of *Chriſt* 1642, or at leaſt took for a peculiar Duct; for it is probable that the ſame had been obſerv'd by former Anatomiſts, but might be taken for a Vein or Artery. This Duct is about the Bigneſs of a Raven's Quill near the Inteſtine, though more ſlender in Parts remoter from it. It is uſually reckon'd and deſcrib'd as a ſingle *Duct*; but *De Graef*, who had particularly employ'd himſelf to examine this Part, and its Contents, takes Notice, that he has ſeen it double ſometimes in Men; and ſays, it is generally ſo in *Pheaſants*, *Turkey-Cocks*, *Geese*, and many other Fowls; and ſometimes triple, eſpecially in *Cocks*, *Pidgeons*, &c. The Buſineſs of this Duct is, by the Aſſiſtance of its Branches, to receive the Pancreatick Juice from the Glands, and pour it into the Guts.

This *Ductus Wirtzungianus* empties it ſelf into the *Duodenum* generally by two ſeveral Mouths; one only of which is taken Notice of by Anatomiſts, and opens it ſelf four or five Fingers Breadth below the *Pylorus*, and not ſeldom at the ſame *Foramen* with the *Ductus Communis Choledochus:* The other is ſomewhat lower, but at an uncertain Diſtance. It has no *Papilla*, and is much ſmaller than the other, but is eaſily diſcover'd by blowing into the larger. The Office of the *Pancreas*, in which that Duct

as a Part is included, is by the Assistance of its Glands to separate a certain Juice from the Mass of Blood, and having so sever'd it, to send it into the Guts by the proper Duct. It is supposed likewise, that the *Pancreas* serves the *Stomach* instead of a Cushion, and prevents it, when much distended, from lying hard upon the *Vertebræ*. As to the Colour and Consistence of the Pancreatick Juice, *de Graef* says he found it limpid like Fountain Water, with some Viscidity. As to the Taste, it appears sometimes to be of a grateful Acid, sometimes almost insipid, often salt, but oftner salt and sour. The Use of this Juice will be discours'd of in its proper Place.

Of the Spleen. *From* Malpighius, Gliſſon, Willis, &c.

THE *Spleen* is a soft spungy Bowel, appearing of a red Colour, inclining to Black, or rather of a Bluish Black. Authors compare the Shape of it to that of a Beast's Tongue, but that may be rather understood of an Ox or Sheep's Spleen, for that of a Man is more like a humane Tongue. The Number of them is not absolutely certain, though generally we find but one, yet many Anatomists have found two, and *Fallopius* asserts three. So *Verheyen* says, *Herregouts*, the Professor of Anatomy at *Louvain*, shew'd them the same in the Body of a young Girl dissected in the Anatomical Theatre there: One of these *Spleens* was of a common Size, the other two but small. *Verheyen* himself opening the Body of a young Man kill'd suddenly, with a good Habit of Body, says he found a double Spleen, one Part of which was of more than a moderate Bulk; the other uppermost is united in a common Membrane, which makes above a fourth Part of an ordinary Spleen. Its Colour varies according to its Age; for in young People it is perfectly red, in grown Persons it tends to a Blackness, but in old Age it is naturally livid.

It is seated in the Left *Hypochondrium*, between the Bastard Ribs and the Stomach; a little convex on the Surface towards the former, and concave next to the Stomach. Its Magnitude is very various, so that it is not precisely determinable: However, the ordinary Length assign'd is about six Inches long, three broad, and one thick. It is connected by the *Omentum*, and by the Means of that, and the Blood Vessels to the *Stomach* and *Left Kidney*; and sometimes the upper Part of it adheres to the *Diaphragm*. It is cover'd with two *Tunicles*, of which the external is derived from the *Peritonæum*, but is naturally so very thin and liable to tear in Dissection, as requires the Anatomist to handle it very gently. In some morbid Bodies it is very firm and thick, in others it becomes cartilaginous and bony. It is join'd to the inner and proper Membrane, only by the Intervention of the Blood Vessels; whence it happens, that upon the Separation there appear on the Surface of the inner Membrane little black or bloody Points, shewing where those Vessels were broken off. Through these Holes or Orifices it is that the Air escapes, upon attempting to blow up the Spleen by the Artery or Vein, after this outer Membrane is separated from it. Which Experiment generally succeeds in Quadrupeds, whilst this Membrane is left on: For if this Membrane be entire when the *Spleen* is taken out, it may be blown up by any of its Blood Vessels, or have its Lymphaticks fill'd with *Mercury*, if all the Vessels be carefully tied, except those you blow or pour into.

The inner Tunicle or Coat consists of Fibres very curiously interwoven, from which it sends over innumerable Threads from one Side to the other. From this Coat very probably are deriv'd those innumerable *Cells*

or little Bladders which make up the main Bulk of the *Spleen:* Though *Malpighius* rather thinks them to arise from the *Venous Duct*, a Difference not very material. These *Cells* are for Number, Figure and Magnitude, various and undeterminate, and best shown by blowing the Spleen thro' the Trunk of the Vein, and then laying a Varnish upon it, and drying it in the open Air, after which cutting it, the Cells remaining distended, shew their Figure and Capacity. These Cells communicate with one another, and exonerate themselves into the Trunk of the Vein.

The Inside of these Cells is furnish'd with divers Glands, according to *Malpighius*, which adhering to one another, six, seven, eight or more together, form a Sort of small *Conglomerate Glands*, in which the *Arteries* and *Nerves* seem to terminate. Their Existence is however very questionable, as not appearing plainly here, nor in the *Penis* at all, whose Structure is the same, but by no Body said to be glandulous. There appear in these Cells spoke of, some little solid Bodies, which some curious Anatomists have taken for oval Glands, in each of which are seven or eight in a Bunch, sticking at the Ends of the Vessels; but the celebrated *Ruysch* denies the humane Spleen to be glandulous, and also denies it to have any other Cells than the Expansions of the Vessels: Nay, he says, That the whole constituent Parts of the humane Spleen are nothing but a Congeries of Arteries, Veins, Lymphæducts, and Nerves, which are bound together by the surrounding Membranes.

The Spleen abounds with common Vessels of all Sorts: Its Arteries come from a large Trunk of the *Cæliack*, and are contorted in their Progress to the Spleen. The Veins go to the Left Branch of the *Porta*, and are called from that *Bowel*, the Splenick Artery and Vein. These Blood Vessels are in respect to the Bulk of the *Viscus* very large, and manifestly communicate with each other. For whether you pour Water into the Artery or Vein, it presently discharges it self promiscuously by either, so that there is no Sign of any *Valve*, nor indeed through the whole *Porta*, whatever some have told us.

Its Nerves come from the *Plexus*, called *Willis*, *Plexus Lienaris*, which lies near Bottom of the Stomach, on the Left S All these Vessels, as soon as they enter Spleen, are wrap'd up in one common C *sula* or Membrane, and are plentifully stributed through the whole Substance of Spleen, the Nerves every where accom nying the Arteries, and circling them riously about. Of the Vein within Spleen there are divers Branches or Trun which on all Sides, as well towards the S stance of the Spleen as the Arteries, punch'd through with many little Ho The *Spleen* abounds with *Lymphæducts* in P portion to its Magnitude, equally, if more than any Part of the Body; wh will yet more fully appear if *Mercury* poured into either Vein or Artery, for indifferently fills both from either: And the Spleen be hung up so filled with the V sels tied for three Weeks or a Month, a then cut, it exhibits them all in their pro Figures and Dimensions. By the Diame of the Arteries and Veins thus exhibited well as from the Capacity of the Trunk the Splenick Artery, which equals that both the *Mesenterick Arteries*, this *Vi* evidently appears to be furnish'd wit greater Proportion of Blood than any ot in the Body.

Mr. *Cowper* from hence, and from the m nifest immediate Communication betw the Arteries and Veins in this Part, draw very natural Conjecture at the Use of t *Viscus*, at least of its peculiar *Mechan* He supposes it to be a subordinate Circu tory Organ, and that by this Congress the arterial and venous Blood here, an *I tus* is communicated to the latter, by wh its Progress through the Ramifications the *Porta* to the *Cava* is promoted; wh otherwise would be so broken by the dou Ramifications of the *Porta*, as to w Strength sufficient to carry it to the H This *Hypothesis* deriv'd purely from the chanism of the Part, carries a Face of g Probability, and deserves to be consider all the Learned and Judicious; but whe it be the sole or ultimate Use of the Par not yet determined. Many other *Hypot* have been offer'd concerning the Use of

…r, and eſpecially *Verheyen* propoſes two …e moſt reaſonable. The firſt is, that …idering the Abundance of Lymphaticks, …ſuppoſe the Spleen made for the Pur- …to ſeparate the *Lympha* from the Maſs …Blood; from which beſides they gather …uable Uſe. One, for as much as the Blood …ing to the Liver being cleanſed, by reaſon …the great Plenty of this Liquor, more …ly depoſites the bilious Humour mix'd …ewith into the Glands of the *Liver*: …e other Uſe is, for as much as the *Lympha* …ſent away from the Spleen to the common …eptacle, the Chyle, from the various Diſ- poſition of its Particles, is render'd more perfect, as it were, by Fermentation. Others will have it, that there is a certain particular Humour ſeparated in the Glands of the Spleen, and that is firſt thrown into the little Cells thereof, and taken from thence into the ſplenick Veins, is carried by the *Vena Porta* to the Liver, there ſerves for the Separation of the Gall; but this Author neither rejects one Opinion, or embraces the other, but believes the chief Uſe of the Spleen to be for the Separation of the *Lympha*.

Of the Liver, Gall Bladder, and Biliary Ducts. From Gliſſon, Malpighius, Verheyen, &c.

THE Liver is a large glandulous Bowel, placed directly under the *Diaphragm* in the Right Cavity of the *Abdomen*, which it wholly …s, and thence ſtretching it ſelf over the …ght Side of the Stomach, towards the Left …vity of the Belly, reaches beyond the …rtilage of the Breaſt, growing gradually …wards the Edges thinner and narrower. …*Tab.* I. *Fig.* III. *A B.* This *Viſcus* is not …equal Size in all Creatures, but in Pro- …rtion to the Body, it is the largeſt in Men …all others. Its natural Bulk is ſuch, that …reaches three or four Fingers Breadth be- …w the Baſtard Ribs.

The Figure or Shape of the Liver is almoſt …und, and pretty like an Ox's Foot. The …per Part of it is convex and ſmooth to- …rds the *Diaphragm*, to accommodate it …the Place where it reſts; and concave or …llow towards the Ventricle, where it is …re uneven. It is divided into two Lobes, …ſometimes only Protuberances, in Men, …t it has many in ſeveral Brutes, having …ur Fiſſures, one through which the um- …ical Ligament or Rope paſſes; a ſecond on …Left Side, receiving the *Pylorus*, and the …ginning of the *Duodenum*; a third on the …ght Side, near the Margin, in which the Gall Bladder is lodg'd; and the laſt in the upper Part, affording a Paſſage for the *Duodenum*. Its Magnitude is various in different Subjects, according to the Proportion of the Body, tho' in a *Fœtus*, or young Animal, it is always proportionably much larger than in Adults; in which *Gliſſon* reckons the ordinary Length of it to be equal to that of the Arm from the Elbow to the Wriſt, meaſuring it by the concave Surface, which is ſo much the ſhorteſt, and differs from the Convex about as much as the String does from a Bow moderately bent. The ſame Author computes the Breadth to equal the Length of the Hand. It is joined to divers Parts, but eſpecially to the *Diaphragm*; to which it is faſten'd by a broad, thin, ſtrong ſemicircular Ligament, called its Suſpenſary Ligament, and deriv'd, according to *Gliſſon*, from the common *Capſula* of the *Porta* and *Gall Ducts*. The Continuity of this Ligament, being interrupted by the Perforation of the *Vena Cava*, has given Occaſion to ſome Anatomiſts to divide it into two. It is likewiſe by another Ligament ariſing from the *Peritonæum* tied to the *Cartilago Xyphoides*; and by a third, which is form'd out of the Umbilical Veſſels, which in grown Perſons turns to a Ligament, it is connected to the

Ten-

Tendons of the Abdominal Muſcles in the *Linea alba* at the Navel. Theſe ſeverally ſerve to keep it in its due Situation, beſides which it has the Blood Veſſels. This Bowel has a Motion, tho' not proper or peculiar to it ſelf, but depending on that of the *Diaphragm*; to which being ſo ſecurely tied, it muſt of Neceſſity obey its Motion, and in Expiration be drawn up, and in Inſpiration let down again.

Malpighius, who inquired with great Induſtry into the Structure of the *Liver*, has obſerv'd that it was compoſed of a great many little Lobes of a conick Figure; that theſe little Lobes were made up of ſeveral little glandulous Bodies, wrapt up in particular Membranes that are united one to the other; and that each Lobe, how ſmall ſoever it be, fails not to have in it a Branch of the *Porta*, one of the Bile, and one of the *Cava*, in ſuch a Manner, that the whole Subſtance of the Liver is no other than a Maſs or Collection of an Infinity of little glandulous Bodies, repreſenting a Bunch of Grapes, and Ramifications of different Veſſels, in which is made the Filtration of the Bile. Every one of theſe Glands, according to the further Obſervation of *Malpighius*, is compoſed of ſix unequal Sides or Faces, which are better to be ſeen in Fiſhes, and ſome other of thoſe Animals which are called imperfect, than in Men, or Animals of a larger Kind.

The Veſſels of the Liver are of five Kinds, to wit, the Nerves, Arteries, Veins, Biliary Canals, and Lymphaticks. It receives four fine ſmall Nerves, two from the Sixth Pair, the third from a Branch of the Stomach, and the fourth from the Intercoſtals, which communicate to this Tunicle a dull unactive Senſation of Pain. The *Cæliack Artery* ſpringing from the *Aorta*, divides it ſelf into two Branches, one whereof is beſtow'd on the *Liver*, and the other on the *Spleen*. The firſt, which is much the leaſt, forms the Gaſtrick, the two *Cyſticks*, the *Epiploick Inteſtinalis*, and *Gaſtroepiploick*, before it enters into the Liver, where it loſes it ſelf in being divided into as many ſmall Ramifications as the *Porta*. There are ſome Anatomiſts who pretend to diſcover the Branches of this Artery encloſed with thoſe of the *Vena Porta*, and with the Branches o Hepatick Canal in one and the ſame brane.

The principal Veſſels of the Live *Vena Cava* and *Vena Porta*, which ar tended in equal Numbers throughou whole Subſtance of the Liver. So that Lobe, and all the little glandulous B which form the *Concave* and *Convex* P the Liver, are equally furniſh'd with Veſſels. Thoſe of the *Vena Porta* do diſcharge any Thing into thoſe that re the Bile, neither do thoſe of the *Vena* by the *Anaſtomoſes* which they have with another, as ſome Anatomiſts beli but they traverſe the little glandulous whereof the Liver is compos'd, which them to enter the Branches which give thoſe which receive, ſo that all the Live ſpread with Ramifications of the *Porta* the *Cava*; but with this Difference notw ſtanding, that thoſe of the *Porta* bring and thoſe of the *Cava* carry out.

The *Biliary Ducts* are likewiſe as nu rous in the Liver as the Branches of *Porta*, ariſing from thoſe Glands in the ver *Malpighius* ſpeaks of before, ſeveral which joining together, form little Tru which run all along with the Branche the *Porta*, and theſe again uniting, f larger Trunks, which are always found of Bile, and make the *Porus Bilarius*, w being diſtributed all over the Liver, rece in the Manner foregoing the *Bile* which ſeparated by theſe Glands, and terminat in the *Meatus Hepaticus*, and that in *Ductus Communis*, at length diſcharges Bile into the *Duodenum*.

Beſides this Diſcharge, which is ſuppo to be a great one, it likewiſe delivers P of its Bile into the Gall Bladder, by a D pretended to be diſcovered firſt by Mr. *P rault*, and by him called *Ductus Cyſtonep cus*, though long before deſcribed by *Gli* but defectively in one Reſpect, in that does not take Notice of any immedi Communication between the *Porus Bila* and the Gall Bladder by Means of t Duct. *Verheyen*, according to the Courſe the Bile through that Duct from the *Po Bilarius*, reverſes the former Name, a more properly calls it *Hepaticyſticus*, and ferts *Gliſſon*'s Right to the Diſcovery, wh

our had perhaps been otherwiſe loſt to for want of dignifying the Trunk, as rely calls it, with a diſtinct Name.

erheyen, in the Proſecution of this Diſ-ry, has obſerv'd in the Gall Bladder of Ox, not only one but three Orifices d into it, by blowing into each of ch, the Wind penetrated the *Ductus He-*, and offering to trace them, he found two of them join'd together before they d the Hepatick Duct, and enter'd into h a ſingle Stem. The other he obſerv'd join'd juſt at its Orifice into the Gall dder by another Duct, whoſe Roots diſpers'd through the Subſtance of the r. In another Subject the ſame Author he diſcovered four Hepaticyſtick Ducts, ugh each of which he blew into the Bladder. In further Proof of this Diſ-ry, he examin'd the Gall Bladder of di-Oxen, and never failed of finding one wo ſuch Orifices opening into the *Ve-a Fellis*. Theſe Obſervations are con-d by an Experiment made by Doctor *dwait*, in a Lecture made on this *Viſcus* the Theatre of the College of Phyſicians, re the whole Society, who by blowing o the *Porus Bilarius*, after having open'd Gall Bladder, ſhew'd the Wind iſſuing at a great many Orifices, which gives us aſion to think, that if theſe Ducts were efully trac'd, they would be found to e from every conſiderable Branch of the *us Bilarius*, as Doctor *Drake* ingeniouſly poſes.

One of theſe Ducts the forementioned nous Author *Verheyen* gives a Deſcription through the whole Tract of it; which, ocular Demonſtration ſhall better inform about the reſt, may ſerve to give us an t of them all. It runs from the *Porus Bi-ius* to the *Veſicula Fellis*, in Length about ht Inches, and is about the Thickneſs of a ll Straw, but ſomewhat thicker near the ll Bladder, where it is join'd juſt at the ertion by another Duct, the Roots of ich are diſſeminated through the Sub-nce of the Liver. In its Courſe it receives ous *Tubuli*, or little Gall Ducts, from the nds of the Liver, moſt of which are in-ted ſo as to point towards the *Veſicula* ugh though ſome about the Extremity ueſt to the *Hepatick Duct* point towards that; from which Contrivance the Author argues reaſonably enough, that probably when the Gall Bladder is ſo full as not to admit of any more, they diſcharge themſelves into the *Hepatick Duct*, though their ordinary Courſe be to the Bladder: Which is farther confirm'd by the Experiment of blowing into the *Porus Bilarius*, which eaſily fills the Gall Bladder, though the ſame *Flatus* cannot by any Compreſſion be made to return that Way to the *Porus Bilarius* again: Yet if the End of a Blow-Pipe be put into the Orifice of the Bladder, the *Flatus* pierces readily to the Hepatick Duct; which ſhows that the ſole Obſtacle is the oblique Inſertion, or Valves of the Mouth of theſe Ducts, and that in the Channel, the *Flatus*, and conſequently the *Bile*, moves indifferently either Way.

This Duct is inſerted obliquely into the *Veſicula Fellis*, and running a little Way between its Membranes, diſcharges it ſelf into it about three Inches above the Neck, after the ſame Manner as the Ureters do into the Urinary Bladder. The *Porus Bilarius*, or Hepatick Duct, which is the moſt conſiderable of all the Biliary Ducts, is form'd after the Manner of a Vein, from the Concurrence of infinite ſmall Ramifications ſpringing from Glands, which united make up divers Trunks, equal in Magnitude to the Branches of the Hepatick Arteries, which accompany them, Branch for Branch, through the whole Subſtance of the Liver, and are wrapped up in the ſame *Capſula* with the *Porta*: Theſe Branches are about the Size of a Wheat Straw, but the largeſt of theſe are ſometimes ſo ſtretch'd, as to be big enough to admit a Man's little Finger, and are diſtinguiſhable from the Ramifications of the *Porta* chiefly by their Contents. Beſides the *Capſula* which is common to that and the *Porta*, it has a thick white proper Coat, like the muſculous one of an Artery. On the concave Side of the Liver, the ſeveral Ramifications meet and form one Trunk or Channel, which is called more peculiarly the Hepatick Duct, about the Bigneſs of a Gooſe Quill, which deſcending about two Inches, meets with the Cyſtick Duct, and together with it, forms that which is called the *Ductus communis*, which deſcending in a Right Line about four Inches, farther

diſ-

diſcharging it ſelf into the *Duodenum*, by an oblique Inſertion, oftentimes at the ſame Aperture with the Pancreatick Duct.

The Gall Bladder is a membranous Receptacle, in Figure ſomewhat like a Pear, ſituated at the lower Margin of the Liver, on the concave Side. It is about the Bigneſs of a Pullet's Egg. It adheres to the Liver, not only by its Veſſels which it receives from it, but likewiſe by its Membranes, the external or common being the ſame with that of the Liver, and is a good Part of its Subſtance as it were immers'd in the Liver. The lower Part, which hangs out of the Liver, reſts upon the *Pylorus* of the Stomach or Colon, which it dyes yellow by thoſe Parts of Gall which tranſude through its Membranes. Its Membranes are reckoned five, an outer or common one from the *Peritonæum*; an inner one on that Side which adheres to the Liver from the *Capſula* of the *Porta*, and of the *Porus Bilarius*, beſides three proper; firſt the exterior or vaſculous Coat, ſecondly the muſcular Coat, and thirdly the inner or glandulous Coat.

Thus the Tunicles of the Gall Bladder are deſcrib'd by ſome who are more nice than knowing in diſtinguiſhing Membranes, for by the Aſſiſtance of the beſt Microſcopes upon a Piece of a Gall Bladder dry'd, the Reaſon of this accurate Diſtinction does not appear: But on the other Hand, theſe ſeveral Orders of Fibres ſeem to be only an infinite Perplexity of Veſſels diverſly ramified with ſome Fibres perhaps diſorderly mix'd, which when the Subject is dry are not eaſily to be diſtinguiſh'd.

The Bladder has been divided into two Parts, the Bottom and the Neck; at the Orifice of which latter is plac'd a Ring or Circle of pretty ſtrong Muſcular Fibres, which ſerve as a *Sphincter* to conſtringe the Orifice of the Gall Bladder, and hinder the too liberal Diſcharge of the Bile. Juſt below theſe Fibres, which by ſome have been miſtaken for a *Valve*, is continued another Bilary Duct, called *Meatus Cyſticus*, which is about the Bigneſs of a Goole Quill, and at about two Inches diſtance from the Gall Bladder is join'd to the *Meatus Hepaticus*, which together form the *Ductus Communis* before-mentioned.

The Lymphaticks remain only to be ſ
to; and theſe are deriv'd from the co
bate Glands of the Liver, which ar
cover'd under the Tunicle of the h
Part of the Liver, towards the Entra
of the *Vena Porta*, in the *Capſula* of v
Gliſſon ſays theſe Veſſels are inſerted,
out having any Communication wi
Liver. But tho' the Lymphatick Veſſe
numerous, they are not eaſily obſerv'd
humane Subject for Want of live Diſſec
or at leaſt whilſt the Parts are warm
in other Animals, which may be diſ
alive, if a Ligature be made upon the
and the *Bilary Ducts*, they become very
ſpicuous; but by blowing into the A
or Gall Ducts, they may be made vi
and appear very numerous on the co
Surface of the Liver, where they ran
Lymphatick Gland, from which the ex
ing Lymphæducts ariſe, and empty th
ſelves into the Receptacle of the Chyle.

The Ancients imagined that it was
the *Liver* that elaborated the Blood, an
ſtributed it to the Parts for their Nutri
and for this Purpoſe they will have it,
it was convey'd by the ſame Veins
were deſtin'd to carry the Blood fro
Liver to the Inteſtines. To overthrow
Opinion, we need but examine the op
Motions which were aſſigned to the C
and the Blood, there being no Reaſon
believe that two Liquors, the one aſce
ing and the other deſcending, could pa
the ſame Time in the ſame Veſſel, con
to the Circulation of the Blood, which
been diſcovered ſo different to this Diſt
bution.

The true Uſe of the Liver is to ſerve,
ſeveral other Parts do, for the refini
the Blood, which is done after this Ma
The Blood that is brought into the L
by the Arteries, and that which is bro
from the Spleen and other Parts of the L
er Belly by the *Vena Porta*, being ſt
Bile and Impurities, is conducted by
Extremities of the Veſſels into the
Glands that form the Lobules, whereo
whole Subſtance of the Liver is com
The Blood being filtred through the P
ties of the Glands, is ſeparated from
Bile, which being received by the C
laries of the *Vena Cava*, is carried by

larger Trunks into the Heart, and the Bile is receiv'd into the Biliary Ducts, and from thence convey'd into the Gall-Bladder, or thrown into the *Duodenum*.

Of the Kidneys, Glandulæ Renales, *and* Urinary Paſſages. *From* Bellinus, Bidloo, *and others.*

THE Kidneys are reddiſh Parts, abounding with Blood and *Serum*, lying upon the Lumbar Muſcles, under the Liver on one Side, and the Spleen on the other, appointed for the Separation of an Urinous Liquor from the Maſs of Blood, and diſcharging it by the Ureters to the Bladder. They are plac'd betwixt the Coats or Foldings of the *Peritonæum*, which ſerves them for an external Membrane, which, becauſe of its Fat, is call'd *Tunica Adipoſa*. The Right Kidney in Men is ſomething lower than the Left, becauſe of making Way for the Liver on that Side; but in Brutes it is generally the contrary. The Shape of it moſt nearly reſembles that of the Bean, being commonly about five Inches long, three broad, and about one and a half thick.

They are inveſted with two Membranes, the external, as ſaid before, from the *Peritonæum*; and the internal, from the outward Coat of the Blood Veſſels, which does not ſtick ſo cloſe, but that it may be eaſily ſeparated. By their external Membrane they are tied to the Loins, by their Blood Veſſels to the *Aorta* and *Cava*, by their Ureters to the Bladder. The Right Kidney ſometimes ſticks to the *Cæcum*, and ſometimes to the Liver; the Left to the *Colon* and *Spleen*. Their Subſtance conſiſts of Glands and Veſſels of ſeveral Kinds, the external Part of which carries a very different Face from the inward. The external conſiſting moſtly of Glands, and very fine Ramifications of the Blood Veſſels, which latter ſhooting their Branches round like Lines drawn from a Center, form divers little elegant Star-like Figures, which, cutting the Kidney lengthways, ſhew themſelves very readily. Next within theſe appear a Number of ſmall Urinary Veſſels, which look like pale fleſhy Fibres, which joining together, make the *Caruncuiæ Papillares*, which are only a Bundle or Collection of theſe little Urinary Pipes, as may be ſeen in *Tab. IV. Fig. V.* from *Bidloo*; and theſe end again in ſhort Tubulous Bodies or larger Pipes, anſwering to the Number of the *Papillæ*, which are uſually twelve, and are call'd *Fiſtulæ Membranaceæ*, being only Productions of the membranous Cell call'd the *Pelvis*, which is a Cavity in the hollow Part of the Kidney, poſſeſs'd by a Dilatation of the Ureter.

The *Ureters* are long round membranous Pipes, ſtretch'd or reaching from each Kidney to the Bladder, that they might be capable of conveying the Urine into that Veſſel. See *Tab. I. Fig. III. q, q, q.* Their Number is generally two, one on each Side; but ſometimes there have been two and three found, as Authors write. They are carried to the Bladder betwixt the two Coats of the *Peritonæum*, ſomething inflected like the Letter *S.* and are obliquely inſerted near the Neck of the Bladder. They paſs out of the concave Part of the Kidneys a little below the Middle, from whence, by the Situation of the Bladder and the Kidney, their Length may be computed. They are commonly as thick as a Raven's Quill, though in great Drinkers uſually larger, and yet more diſtended in ſuch who are much ſubject to the Stone, in ſome of whoſe dead Bodies *Bartholin* ſaw them dilated to the Size of a Gut. They receive Veins and Arteries from the Blood Veſſels adjoining, and Nerves from the Intercoſtals and *Medulla Lumbaris*.

The Kidneys have Arteries and Veins call'd *Emulgents*, and are uſually but one of a Sort to each Kidney, though they have been obſerv'd ſometimes to be more. *Verheyen*

ſays, he has publickly ſhown two *Emulgent* Arteries on the Left Side of a Humane Body, ariſing about two Fingers Breadth Diſtance from each other out of the *Aorta*, but that he had often ſeen two Veins both on one Side and the other. The *Emulgent Arteries* ſpring from the *Aorta* by a ſingle Root, but at the Entrance into the Kidneys, divide themſelves into two Branches, and thoſe again into many others, the ſeveral Ramifications of which are diſtributed into all the Glands, which make the Cortical Part of the Kidneys. Beſides theſe Blood Veſſels, the external Coat of the Kidneys, with the adjoining Fat, enjoys a peculiar Vein and Artery, call'd the Adipoſe Artery or Vein, ſometimes ſupply'd from the great Trunks, ſometimes from the *Emulgents*.

The *Nerves* of the *Kidneys* come from the *Plexus* of each Side, call'd the *Plexus Renalis*, which is form'd out of the Branches of the *Intercoſtal* and *Medulla Spinalis*; the Twigs of which twine pretty thick about the *Emulgents*, eſpecially the Artery. The Lymphaticks in the Subſtance of a Dog's Kidney, eſpecially in their external Surface, are eaſily obſerv'd if the Subject be living, and the Circulation of the Blood carried on, and then having the *Emulgent* Veins, Nerves, Membranes, *&c.* bound, with the Artery at Liberty; for ſo one of the *Lymphaticks* being bound, though before it was inviſible, is now plainly to be ſeen; and ſometimes they are diſcoverable by being thus bound juſt after the Death of the Animal, for the *Lympha* does not ceaſe to flow ſo ſoon as the Blood. In Men we have not the Opportunity of diſcovering the Lymphaticks of the Kidneys; but undoubtedly there are ſuch Veſſels there, ſince we find the ſame Neceſſity for their being in Men, as in Dogs and other Creatures.

The Uſe of the Kidneys is plainly to ſeparate the Urine from the Maſs of Blood, that is the ſuperfluous *Serum* of the Blood, with other excrementitious Humours mix'd with it. This Humour, together with the Blood, is brought by the *Emulgents*, and ſeparated by Means of the glandulous Subſtance of the Kidneys, through whoſe Paſſages or Ducts, call'd *Papillæ* and *Fiſtulæ Membranaceæ*, it is brought through the *Pelvis* and Ureters into the Bladder. After the Secretion of Urine is perform'd, the Blo is return'd by the *Emulgent Veins* to the *na Cava*. And for the eaſier Separation the Urine, and a larger Spring of it fr the Renal Pores, the *Pelvis* is appointed ing a large Cavity, that takes the Urine fr the Urinary Veſſels before it is tranſmit to the Ureters. Before that, it is made many other Strainers, where the leſſer exc tory Ducts by Degrees come into larger a larger e'er they can flow into ſo large a C vity; for without there was ſuch a ſpaci Cavity in the Kidneys, the Serous Humo by reaſon of their glandulous Subſta throughout, would not be able to flo and therefore the Motion thereof would irregular and confus'd. The ſame Rea may be given for the Capacity or Larger of the Chyliferous Ciſtern, from the Mu plicity of the Lacteals and Lymphaticks r ning in on all Sides.

Malpighius asks the Queſtion, How Gravel and little Stones in the Kidneys paſs through the Urinary Fibrils that are ſtraight, and by theſe *Papillæ* fall into *Pelvis* before they are excluded out of Kidney? And he gives this Anſwer, T the Veſſels being membranous, will ſtre or extend themſelves ſo as to let the Gra paſs. *Diemerbroeck* was of Opinion, that tartarous Matter in the *Serum* coagulated ſelf, and harden'd or cruſted into little Sa and Stone after it had paſs'd through minute Veſſels of the Kidneys, which h pen very often, and ſometimes the Mat hardens in the ſmall Branches, which bre and lets it fall into the *Pelvis*.

The *Glandulæ Renales*, *Capſulæ Atrabilar* or *Renes Succenturiati*, are glandulous Pa ſeated between the Kidneys and the Tru of the Vein and Artery, above the *Em gents* next the *Cava*, and uſually are fi with a blackiſh Liquor. Their Shape is certain, being either ſquare, triangular, o or irregular. They are almoſt as big as Kidneys themſelves in a *Fœtus*, but do increaſe with the reſt of the Body by A but rather waſte away. Their Veins Arteries are deriv'd either from the adjoin Veſſels or the *Emulgents*, and their Ner from the *Plexus Renalis*. Their Uſe is to ſe parate that black Liquor they contain; bu for what Intent or Purpoſe that Juice is ſe-

parated

rated, remains yet to be discover'd; tho' it is suppos'd by some, that that Humour is convey'd by certain peculiar unknown Ducts to the *Emulgent Artery*, there to procure a certain Precipitation, by which Means the Urinous Matter departs or separates easier from the other Mass; and the accurate *Verheyen* seems rather to favour this Opinion, than to think it an useless Part.

The Urinous Bladder is a Vessel shap'd like a Pear, plac'd in the lowest Cavity of the Belly, betwixt the Duplicatures of the *Peritonæum*, receiving the Urine from the Ureters, and discharging it as Occasion requires. It rests in Men directly upon the *Intestinum Rectum*, and in Women the *Vagina* interposes betwixt that and the Bladder, which last is divided into two Parts, the *Fundus* or Bottom, and the *Cervix* or Neck. The first is broader, and almost upright in Men; the latter is straighter, and seated lower. It is made up of three Membranes or Coats, the outmost of which, or common Membrane, is from the *Peritonæum*. The middle or muscular One is compos'd of fleshy Fibres running lengthways, which are intersected by others irregularly dispos'd across them. The third is said to be *nervous*, and has a great many Glands under it, which separate a mucous Matter, to defend it from the Acrimony of the Urine, which otherwise might offend it, being extremely sensible. It is capable of being extended to a great Degree, and consequently the external Dimensions of it are liable to great Alterations.

It is tied to the *Peritonæum* and Navel by the *Urachus*, which after the Birth serves only as a Ligament. The Neck of it in Men adheres firmly to the *Rectum*, and in Women to the *Vagina Uteri*, and before to the *Ossa Pubis* by Means of the *Peritonæum*. It is perforable with three Holes, to wit, with two by the Ureters, thro' which the *Urine* falls into the Bladder; and a third, by which it is discharg'd. At the *Exit* of the Bladder, to prevent the perpetual Dripping of Urine, is plac'd a Muscle, consisting of circular Fibres, which is call'd the *Sphincter* of the Bladder. This Muscle keeps the Bladder constantly shut, and is only open'd, when, by the Contraction of the Abdominal Muscles, the Bladder is compress'd, and the Urine forc'd out. These circular Fibres are plac'd outwardly directly under the outward Coat, and there are others plac'd inwardly, being more oblique in the Sides. These Fibres do not seem to relate to contracting the Muscle of the Bladder, because it does not appear how the Neck is drawn together from their Contraction; from whence they seem rather to run with the second Coat or Membrane of the Bladder for the Expulsion of Urine; and therefore are Antagonists in respect of their circular Fibres, unless perhaps they are form'd for the Support of these.

Amongst the Urinary Passages, the *Urethra* is the last. This is a membranous, or in some Measure a nervous, Tube or Pipe, continued from the Neck of the Bladder to the Extremity of the *Penis* in Men, giving Passage as well to the *Semen* as the Urine. The Length of the *Urethra*, not only according to the different Ages and Sizes of Men, but likewise as to the Sex, is very different. In Men, it commonly extends to eight, nine, and sometimes more Inches long, and terminates at the very End of the *Penis*, and the Breadth is larger than the *Ureters*: But in Women, it is scarce two Fingers Breadth long, but broader, and capable of greater Distention without the Exquisiteness of Pain the Men suffer; whence Stones can be extracted from the Bladder with less Difficulty, and although sometimes they be of great Sizes, they are taken from thence only by the Dilatation of the *Urethra*.

The *Bladder* and *Urethra* have Veins and Arteries from the *Epigastricks* and *Iliacks*, and in Women from the *Spermaticks* likewise; and Nerves from two *Plexus* in the *Pelvis* of the *Abdomen*, form'd out of Branches of the *Par vagum* and the Nerves of the *Os Sacrum* united. There are three pretty remarkable Glands, discover'd not long ago by Mr. *Cowper*, whose *excretory Ducts* terminate in the *Urethra*, and which are situate not far behind its Membrane; but these relating in their Use rather to the Parts of Generation than to the Urinary, they shall be describ'd with the *Penis*.

Of the Diſeaſes, and their Cures, belonging to the Abdomen, *and its Contents: And firſt of the* Caul *and* Peritonæum. *From Mr.* St. Hilaire, *&c.*

THE *Epiploon* or *Caul* is ſubject to all Sorts of Diſeaſes, ill Conformation of the Parts, and Solution of Continuity. It may labour under an Inflammation, and ſuffer a Suppuration, which is very dangerous, ſo that it can never be reſtor'd to the ſame Condition as before. As it is the Receptacle of the Impurities of the Liver and Spleen, it is ſubject to be ſtuffed with Abundance of Filth, which makes it ſometimes ſo big, that *Veſalius* ſaw one that weigh'd five Pounds, whereas in a natural State it will not weigh above half a Pound. It is difficult to diſcharge this Part when loaded with any noxious Humours, becauſe it is a Part you cannot readily come at with Medicine. Sometimes we meet with them entirely rotten and gone in Hydropick Caſes, and Scorbutick Diſpoſitions: Sometimes in Children, and little Infants, they are conſum'd away in a few Days; and ſometimes waſh'd away before the Birth by the Heat of the Womb, or other Irregularities of the Mother during her Gravitation.

Columbus has obſerv'd the Caul to lie upon the *Peritonæum* and the *Epigaſtrick* Muſcles, to fall upon the Navel, and likewiſe on the *Os Pubis*. When it affects the *Navel*, it is a Kind of *Hernia*, call'd *Epiplomphalos*, which is an indolent Tumour, that is ſofter and larger on one Side than the other, having a large *Baſis*, and when it is preſs'd to reduce it, the Part re-enters without any Noiſe. When the Caul falls upon the Bladder and Womb, it preſſes the Orifice thereof, and makes ſuch Women barren. It likewiſe cauſes the *Epiplocele* in Men, which oftner happens on the Left Side than the Right, becauſe the *Caul* lies more on that Side. When the Caul is wounded, the ſame ought to be cut off, to prevent a Mortification.

The chief Diſeaſes incident to the *Peritonæum*, are the *Hernia* or *Rupture*, which are almoſt always caus'd by the Dilation of that Part, and rarely by the Rupture or Breaking of it. *Hernia's* are known both by the Eye and the Hand, either of which, or both, will ſufficiently diſcover this Evil we call *Epiplocele*, when from the *Caul*; *Enterocele*, the Inteſtines; and *Hydrocele*, when it is caus'd by Water falling into the *Scrotum*.

The *Navel* often ſuffers in its Conformation, as when it is not exactly plac'd in the Middle of the Belly, and that it draws up, which is the Reaſon, according to *Riolan's* Obſervation, of its being too ſhort, ſo that it cannot ſupport the Liver, that Part being heavy, preſſes upon other Parts of the Lower Belly, from whence come a great many Inconveniencies. Sometimes the Umbilical Vein opens, and loſes a great deal of Blood: Sometimes the Veſſels of that Part ſuffer a Solution of Continuity, which is no way mortal; for *Riolan* ſays, he has known ſeveral Women have three Umbilical Veſſels clear cut off. In ſhort, the Navel is liable to Inflammations, eſpecially in Infants, which if dangerous, are known by their Hardneſs, Redneſs, Heat and Pulſation; but chiefly if they terminate in an Abſceſs, and that opens and diſcharges a purulent Matter, it is preſent Death. But of all the Diſeaſes of thoſe Parts, there is none more common than the *Exomphalos*.

Of the Exomphalos *and* Ventral Hernia. *From Mr.* Dionis's *Courſe of Chirurgical Operations.*

THE *Exomphalos* comprehends all the Tumours incident to the Navel; but this particularly is a Protuberance of the Navel, which is reduced to two different Kinds; one of which is of Tumours which form themſelves of Parts, and the other reſults from a Maſs of Humours; and theſe Sorts of Diſeaſes receiv'd different Names, with regard to the ſeveral Parts, or the various Humours which they cauſe. Thoſe occaſion'd by the Parts are of three Sorts: One is call'd *Enteromphalos*, which is when the Inteſtine comes out; the other *Epiplomphalos*, which is the Protuberance of the *Epiploon*; and the third *Entero-Epiplomphale*, when that of the Inteſtine and *Epiploon* concur at the ſame Time. Thoſe which are caus'd by Humours, ſubdivide themſelves into four Species. The firſt, call'd *Hydromphalos*, is occaſion'd by Water: The ſecond, by Wind, is call'd *Pneumomphalos*: The third, that is harden'd by Fleſh, is term'd *Sarcomphalos*: And the fourth is *Varicomphalos*, which conſiſts in the Rupture or Dilation of ſome Veſſels. To the two firſt general Kinds of *Exomphalos*, Authors add a third, which is compos'd of both the former, *viz.* of the Parts and Humours together. When the Tumour is produc'd by the Inteſtine and Water, 'tis call'd *Entero-Hydromphalos*; and when by the *Epiploon* and the Fleſh, *Epiplo-Sarcomphalos*; and ſo of others. All the Ancients tell us, that theſe Tumours proceed either from Dilation or Rupture, depending on the internal or external Cauſe: But ſome Moderns don't agree to this Opinion with regard to the Rupture, but affirm all of them to be produc'd by the ſole Dilation of the *Peritonæum*, which, according to them, may extend and ſtretch to a Degree ſufficient to form theſe Tumours, how large ſoever they are, ſince it dilates yet more in Dropſies.

Theſe differing Opinions deſerve a particular Diſcuſſion; but yet I acknowledge but one Cauſe of the *Exomphalos*, namely *Rupture*, I mean of the *Exomphalos* of the Parts; for the Dilation which the Ancients, and ſome Moderns, admit, ſeem to be impoſſible with regard to the Part of the Navel, which being no more than a Knot made at that Part after the Ligature of the String, can no more be at Liberty to lengthen it ſelf, than the Scar of a Wound in the Skin: And to clear what I ſay, no more is neceſſary than to obſerve, that the Navel is form'd by the Reunion of the Umbilical Veſſels, which after the Birth contract themſelves, and in drying, degenerate into Ligaments; and that ſeveral Veſſels of the *Peritonæum* enter into its Compoſition, as alſo ſome *Aponeuroſes*, the whole together ſo mix'd and interwoven, that it appears to be no other than one continued Body, incapable of any ways extending it ſelf.

I own, that the *Peritonæum* may ſtretch in its whole Extent, but not in the Navel; and I dare venture to affirm, that I have Experience on my Side, having open'd ſeveral of theſe Tumours both in living and dead Bodies, where I never could find that the *Peritonæum* internally extended it ſelf, as it muſt have done, if theſe mention'd Tumours were produced by Dilation. After having cut the Skin, I found no longer any Membrane, and thruſting my Finger into the Aperture which was at the Navel, it enter'd into the Cavity of the *Abdomen* without any Reſiſtance, which has confirm'd me in the Opinion in which I perſiſt, That Rupture is the ſole Cauſe of the *Exomphalos*. We muſt diſtinguiſh betwixt *Hernia* or *Ruptures* of the Navel, and thoſe of the *Scrotum*; for the *Peritonæum* extending it ſelf to the Groins, to conduct the Spermatick Veſſels to the Teſticles, the *Epiploon* or Inteſtines are very aptly

ly diſpos'd to glide along with theſe Productions, and fall as far as into the *Scrotum*, without breaking the *Peritonæum*; but it is not the ſame in the Navel, which not being ſuſceptible of the like Diſtention, cannot give Paſſage to any Part before 'tis broken, and all its Parts diſuniting, permit the *Epiploon* or Inteſtines to come out.

Thoſe who believe that *Exomphali* may be occaſion'd by the Dilation of the Navel, aſcribe the Cauſe to ſome Humour which inceſſantly ſinks into it. But if this was true, theſe Tumours would have a very ſmall Beginning, and would augment by Degrees, inſtead of perfecting all at once, as they commonly do, which happens, when by ſome great Strain the Knot of the Navel is broken and ſeparated. My Opinion is alſo prov'd by Women being more ſubject to them than Men, by reaſon that the violent Efforts and Pains in laborious Births frequently break the Navel, in order to enlarge the Cavity of the Belly, which at the End of their Pregnancy is ſo hard ſtretch'd, as not to bear any farther Extenſion without a Rupture of the Part.

When an *Exomphale* is form'd by the Inteſtine, or the *Epiploon*, or both together, theſe Parts are as ſoon as poſſible to be puſh'd back into the *Abdomen*; to ſucceed in which, the Patient muſt lie on his Back, and having his Knees mounted, muſt remain a ſmall Space without reſpiring or crying, whilſt the Surgeon tenderly preſſing the Tumour, thruſts in the Parts of both of them, beginning with the Inteſtine, which being ſituate under the *Epiploon*, ought to be firſt replac'd. He will know when this Reduction is finiſh'd, by the Diminution of the Tumour, and the Noiſe which that Organ makes in its Entrance; after which, he preſſes the *Epiploon*, in order to oblige it to return to its Place, carefully avoiding all Precipitation in theſe Reductions, for fear of bruiſing the Parts, which he may conclude to be all return'd into the Body, when he ſees the Purſe empty. When theſe Parts are ſo extended that the ſole Aſſiſtance of the Surgeon's Hand cannot reſtore them, he muſt conſider what Obſtacles oppoſe his Endeavours, in order to ſurmount them. Thoſe which I find are two: One is, when the Gut is fill'd with either Excrements or Wind; and the other, when the Paſſage by which it came out grown too narrow. In theſe Caſes the Surgeon muſt have Recourſe to Remedies, which the moſt proper are *Carminatives* diſſipate the Flatulencies, and *Emollients* relax the Parts which occaſion the Stoppa He ought to make Uſe of an Embrocati or irrigating Fomentation, on the Part, w Oil of Lillies very warm, or Ointment Marſhmallows, and apply a Cataplaſm co poſ'd of all the mollifying and humera Herbs, the Decoction of which may be giv to the Patient by way of Drink or Clyſte and may alſo ſerve to make a ſmall Bath lay the Patient in.

Theſe Parts being mollified, the Surge muſt make another Effort towards their R duction; and the ordinary Facility of ſu ceeding in this ſecond Attempt, convin us, that the Uſe of Medicaments are not be neglected. This perform'd, the Surgeon next Task is to prevent the ſtarting out what has been forc'd in; till which is a compliſh'd, he has perform'd but half t Operation, which conſiſts of two Parts; on is to reſtore the Parts to their Place, and t other to keep them there when reduce This ſecond Part of the Operation is per form'd by a good circular Bandage made purpoſe, and proportion'd to the Bulk the Perſon. The Band ought to be ſeven eight Fingers Breadth broad, and of a ſtron Cloth ſeveral times double. It muſt have the Middle a ſemi-globular Riſing, like Muſhroom, which is to be plac'd direct on the Navel, that by filling the Cavit the Surgeon may deprive the Part of all O portunity of returning outwards. This Ban dage ought to be ſuſtain'd by a *Scapular*, o by Straps made of white Fillet, and ſuch a are us'd to hold up the Breeches of thoſe whoſe Belly is too big. Before the Banda the Rupture Plaiſter muſt be apply'd, an above it muſt be laid a large Bolſter moiſten in hot Wine, in which ſeveral aſtringen Ingredients have been boil'd.

I have already told you, that the *Exomphales* were of four Sorts, all which requi different Methods of Cure; and frequently all Remedies proving vain, they of Neceſſity demand Chirurgical Operations in orde thereto. The *Hydromphale* may be diſſipa ted by reſolvent Medicines, eſpecially wh ſmall.

ſhell. To this Tumour there ought to be
pply'd a Spunge throughly moiſten'd in
Wine, in which has been Cummin and Lu-
ine Seeds, *Camomil*, *Elder* and *Roſe Flowers*,
omegranate Pill, Laurel Berries, and com-
on Salt; and if notwithſtanding this Ap-
lication the Tumour grows bigger, and in-
imates that no Cure is to be hop'd for by
eſolution, the Surgeon ought to prepare
or a Punction in the Middle of the Navel
n the Manner following: He is provided
with an Inſtrument of three Fingers Length,
nd not larger than a ſmall Quill, with a
handle at one End, and a triangular Point
t the other in order to pierce the Skin. 'Tis
un thro' a very ſmall Silver Pipe or Tube,
whoſe Cavity is proportion'd to this Inſtru-
ment, which is thruſt into the Midſt of the
Tumour; after which, the Pipe is ſomewhat
ardly preſs'd on, in order to force it into the
perture, and withdrawing the Inſtrument
which fill'd the Pipe, 'tis follow'd by the
Water, which the Surgeon ſuffers to run
ut to as large a Quantity as the Patient's
Diſeaſe or Strength will allow. The Pipe,
which muſt remain in the Wound, muſt be
ſtop'd with a ſmall Tent ſhap'd like a *Faucet*,
which muſt be drawn out as often as 'tis ne-
ceſſary to draw out the Water. This Inſtru-
ment may be call'd a *Trocart* or *Tap*, from
the Reſemblance it bears to that which ſome
Moderns pretend to have invented for piercing
the Belly of Hydropick Patients.

The *Pneumaromphale* is cur'd by the exter-
nal Application of Carminative Ingredients.
They diſſipate the Wind, by attenuating,
cutting and diſcuſſing, by their penetrating
and acute Particles, the viſcous and vapo-
rous Matter which feeds the Diſtemper; for
which Reaſon we uſe Rue, Roſemary, Lau-
rel, Wormwood, Aniſe and Cummin Seed,
Roſe, Camomil and Melilot Flowers, Salt
of Tartar, Armoniack, *&c.* of which are
prepared Fomentations or Cataplaſms, as the
Surgeon thinks fit: But if after the Uſe of
theſe Remedies, the Tenſion continues as
hard as before, we have Recourſe to the
pricking of it with a Needle to let the Wind
out.

The *Sarcomphale* is very difficult to cure,
and before attempting it, we ought to exa-
mine whether it is tractable or not. That
which may be dealt with, that is, which af-
fords ſome Hopes of happy Succeſs, is almoſt
free from Pain. The Tumour is even a little
looſe, and moderately hard. In this Caſe
we ought to make a long Inciſion of the
Tumour, in order to diſcover the Fleſh of
which 'tis form'd, from which we muſt cut
off and ſeparate all the Parts to which it a-
heres, in order to take it out whole; but in
dividing and diſſecting this Fleſh, we are
oblig'd to cut the Veſſels which feed it, that
occaſions an Effuſion of Blood when they
are large. We ought then to make Uſe of
Styptick Water, or Vitrioline Powder, to ſtop
it. The Wound muſt be dreſs'd during the
firſt Days with an emollient Digeſtive, to
procure its Suppuration; and afterwards with
a ſharp Mundificative, in order to corrode
and conſume the ſmall Roots of this car-
nous Excreſcence; which effected, we pro-
ceed laſtly to cicatrizing, as in other Wounds.
But if the *Sarcomphale* be intractable, that is,
of a *cancrous* Nature, which may be diſco-
ver'd by its extreme Adheſion, the Reſtleſs-
neſs of the Patient, by the ſtupefying Pains
which he feels, and the varicoſe Nature of
the Tumour, 'tis dangerous meddling with
it: Nevertheleſs, if curable, 'tis by the afore-
ſaid Operation.

The *Varicomphale* being caus'd by the Rup-
ture or Dilation of ſome Arterial or Venous
Veſſels, if the Tumour be ſmall, Endeavours
muſt be uſed to diſſipate it by an aſtringent
Remedy, prepar'd from Bole, Dragon's Blood,
ſeal'd Earth and fine Flower incorporated
with the White of an Egg; which is applied
to the Part, and kept there by a ſomewhat
hard Bandage. If the Tumour be large, and
no Hope left of curing it by Medicaments,
it muſt be laid open, and Vitriol Balls ap-
plied on the Apertures of the Veſſels, as in
the *Aneuriſm*, always obſerving before-hand
general Remedies, as Blood-letting and Pur-
gation; and after the Operation, a Regimen
of good Diet proper to the Diſeaſe.

It frequently happens in *Exomphales* of
the Inteſtines, that, by Neglect of keeping
on the Bandage, theſe Parts are puffed up
and ſwoln with Wind, and fill'd with Matter,
which not being able to return to the ſame
Paſſage by which they came out, they excite
inſupportable Pains and Vomitings, which
continue as long as they remain without the
Cavity of the *Abdomen*; ſo that when the
reſtoring

reſtoring of the Guts is impracticable by the Means already demonſtrated, we muſt proceed as in caſe of a *Bubonocele*, *viz.* by Inciſion, laying open the Tumour with an Inciſion Knife, carefully avoiding the cutting any more than the Skin, or wounding the Inteſtines, which are immediately under it. As ſoon as the Skin can be divided, the Surgeon, by the Aſſiſtance of an excavated Probe, thruſts into the Wound a Pair of Sciſſars, with which he opens the reſt of the Tumour; and if it be clogged with any Purſes of Matter or Bridles, he cuts them with a Toothpick without a Handle, when the Inteſtine being diſcover'd, he draws it yet farther out than it had before ſtarted, in order to allow the greater Extent to the Matter which it contains. He then introduces his excavated Probe into the Cavity, and holding it in the Left Hand, raiſes it outwards, and in its Channel with his Right Hand guides in the Point of a curve Inciſion Knife, with which he cuts whatever occaſion'd the Stoppage: After which, the Aperture being large enough, he returns the Inteſtines by gently thruſting them into the *Venter*, and obſerving to put in thoſe firſt which came out laſt. If Part of the Caul be found in the Tumour after having reduced the Guts, we uſually tie it with a double Thread, at the End of which is a ſtraight Needle, and before making the Extimation, a long End of the Thread is left to come out of the Wound, in order to draw it out when Nature ſhall of her o Accord have ſeparated it.

The Surgeon muſt thruſt into the Wou a great Pledget, or rather Stopple, of L tied to a long Thread, in order to draw out in caſe it ſhould ſink into the Cavity the Belly. It muſt be obſerv'd, that Thread of the *Epiploon* or Caul, and tha the Stopple, muſt be of different Colou that if by Chance the Stopple ſhould be ter'd into the Cavity, upon endeavouring draw it out, we don't run the Riſque being deceiv'd, and miſtaking the Thread the *Epiploon* for it. The Wound muſt provided with Pledgets, which muſt be co ver'd with a Plaiſter and a Bolſter, in orde to apply the Bandage in the ſame Manne which I have ſhew'd you in the *Gaſtrora* You may from hence conclude that this Ope ration is very dangerous, and almoſt alway mortal, by reaſon the Surgeon is oblig'd t cut the *Aponeuroſes* or Tendons which ſur round the Cavity of the Navel; notwith ſtanding which, I once perform'd this Ope ration with good Succeſs. The Patient wa afflicted with ſuch cruel Pains, that he deſire Death every Moment; but as ſoon as th great Guts were put into the Belly again he ceas'd to complain, and afterwards grew per fectly well. I have twice more perform'd the ſame; but to ſay the Truth, the Patient died.

Of the Ventral Hernia *or* Rupture. *From the ſame Author.*

ALL Tumours occaſion'd by the coming out of the *Epiploon* and Inteſtines, are call'd by the general Name of *Herniæ* or *Herniæ's*, and are diſtinguiſh'd by particular Appellations from the Places where they happen. When theſe Parts come out of the Navel, they are call'd *Exomphales*; when they occaſion a Swelling in the Groin, they are call'd *Bubonoceles*; when they deſcend to the *Scrotum*, they are term'd *Oſcheoceles*; theſe two laſt Words being deriv'd from *Bubon* and *Oſcheon*, of which one ſignifies the Groin, and the other the *Scrotum*, and from *Cele* Deſcent: And when theſe Organs find Means to eſcape into ſome Part of the *Abdomen*, they are call'd *Ventral Hernia's*.

The Cauſe of this Sort of *Hernia's* is a Rupture of the *Peritonæum*; for 'tis not probable that they can be occaſion'd by a bare Dilation of this *Involucrum*, which adheres too cloſe to the Muſcles and *Aponeuroſes* which it touches, to extend it ſelf to the Degree requiſite to form ſuch large Tumours. 'Tis then always a Dilaceration, which does not happen on a leſs Occaſion than ſome hard Strain, or in thoſe Places where an Abſceſs or Wound not having been perfectly cicatriz'd, have left the *Peritonæum* ſubject to be

cerate or open again. The Signs which diſcover *Hernia's* are, that they always ſucced the Violence of ſome Strain, come all at once, that they re-enter upon a ſmall Compreſſion, and that being re-enter'd, the Tumour vaniſhes from the Place where it was.

To cure theſe Sorts of Ruptures, we muſt endeavour to cloſe both the Lips of this Wound in the *Peritonæum*, and to keep them in that Poſture, that they may reunite and grow together; but I ſee nothing more difficult; and the Method which *Celſus* propoſes to that End, ſeems too rigorous for me to adviſe you to practiſe it. He ſays, that the Purſe ought to be ty'd with a double Thread run a-croſs the Baſis of the Tumour; and that by binding it tight, the Wounds of the *Peritonæum* muſt be clos'd; or that the Operator may make two Inciſions in Form of a Creſcent, which muſt be oppoſite to one another, and join at their Points, in order to cut out the Middle, which they comprize, which being longer than broad, will have the Figure of a Laurel Leaf. Next he orders to be applied to this Wound, a Suture like that in the *Gaſtrorhaphy*. Beſides the Cruelty of theſe Operations, they oftentimes fail; for one is not certain of rejoining a Wound in the *Peritonæum*, by cauſing all the Tumour to fall to Mortification by Ligature, ſince this Ligature can bind nothing beſides the Skin and the Muſcles, and not at all the other *Involucrum*, and we cannot be aſſured of ſucceeding better by Inciſion: Farther by reaſon that *Ventral Hernia's* always ſucceeding Wounds of the *Peritonæum* imperfectly cicatriz'd, would be Raſhneſs to open them a ſecond Time, and undertake the Cure of this new Wound, when the Surgeon was unable perfectly to cure the old. It would then be very imprudent to promiſe the ridiculous Cure of theſe *Hernia's*. They muſt be contented with a Palliative, and ſearch after Means to render this Diſeaſe ſupportable.

The Prior de Cabriere's *Medicines for* Hernia's.

THE Prior of *Cabrieres* was a very charitable Man, who diſtributed many Remedies in his Country. He was no ſelf-intereſted Perſon, nor pretending Quack, though very cloſe, and made a Secret of every Thing. The great Reputation which he acquir'd in the Province where he liv'd, render'd the Court deſirous to ſee him. He arriv'd there about the Year 1680, and had ſeveral Conferences with the King, to whom he imparted his Secret for the Cure of *Hernia's*, earneſtly entreating his Majeſty, not to publiſh it till after his Death. His Majeſty kept his Word with him, though very much concern'd to ſee the Publick fruſtrated of that Relief; but without infringing his Promiſe to the *Prior*, he found Means to eaſe thoſe afflicted with theſe Infirmities, and influenc'd by a ſingular Goodneſs, reſolv'd to take the Pains of compoſing this Remedy himſelf, and to cauſe it to be charitably diſtributed to all thoſe who ask'd it. To this End his Majeſty commanded four or five Sorts of Drugs, which he ſpecify'd to his Apothecaries, to be brought into his Cloſet; and this Receipt conſiſting only in the Mixture of Spirit of Salt with Wine, as you ſhall ſee by the Deſcription which I ſhall give you immediately, the King uſing only the Spirit of Salt, cauſed the other Drugs to be privately thrown away, and this he did in order to keep his Promiſe to the *Prior* inviolably.

'Twas then that we diſcover'd how many People were afflicted with *Hernia's*, by the great Number of thoſe who came to ask this Remedy. They addreſs'd to the King's Firſt *Valet de Chambre* in Waiting, and gave him a ſmall Note of the Age of him or her who wanted this Remedy: Some Days after which they return'd and received a little Basket, in which were three Bottles of a Pint each, full of this mix'd Wine, which they took in one and twenty Days, as I ſhall ſhew you. There were alſo in this Basket proper Plaiſters, peculiarly adapted to this Infirmity. Of thoſe who have taken this Medicine, ſome have averr'd that they have been relieved and cured by it, others have ſaid it had no Effect on them; which ſhews this Remedy, as well as all others, in different Perſons to be of unequal Virtue, and that there are no Infallible ones. I ſhould yet adviſe the Uſe of it, for though Bandage, aſſiſted by the adſtringent Plaiſter, frequently proves ſufficient to the Cure of this Indiſpoſition, 'tis yet true, that Spirit of

Salt mix'd with Wine cannot do any Thing but Good internally, by communicating to the Parts reduced to their Place an Aſtriction eſſential to the Cure of theſe Infirmities.

The Diſtribution of this Remedy continued four or five Years, that is as long as the *Prior* of *Cabrieres* ſurviv'd his Diſcovery of it to the King. Immediately after his Death, the King publiſh'd the Manner of taking it, with the Compoſition of the Plaiſter which muſt contribute to the Efficacy of the Drink, to the End that all his Subjects might themſelves prepare this Remedy againſt an Infirmity which is but too common; and here is a Copy of the Receipt printed by the King.

The Prior of Cabrieres's *Remedy againſt* Hernia's, *publiſh'd by the* French *King; the Originals remaining in his Majeſties Hands.*

THE Doſe of this Medicine is different, according to the Ages of the Patients; but the Preparation always the ſame, even for Sucking Children, tho' Bandage alone was formerly us'd to cure them. The Manner of preparing and uſing it follows:

From Two to Six Years of Age.

Take of well rectified Spirit of Salt three or four Drops, mix it with a Spoonful or two of Wine; which you muſt make the Patient take every Morning faſting for one and twenty Days ſucceſſively.

From Six to Ten Years of Age.

Take four Scruples of this Spirit of Salt, mingle it very exactly with a Pint of Claret, and order every Morning about the Quantity of two Ounces, ſo that the Doſe may continue ſeven or eight Days; after which renew it, till the Patient has taken it one and twenty Days together.

From Ten to Fourteen.

Take two Drams of the ſame Spirit of Salt to a Pint of Claret. From Fourteen to Seventeen, two Drams and a half in a Pint; and from that Age to the laſt five Drams in a Pint of Claret, order'd as the firſt Proportions.

A Receipt of the Plaiſter.

TAke of Maſtick in Tears half an Ounce, Labdanum three Drams, three Cypreſs Nuts well dry'd, Hypocyſtis a Dram, *Terra Sigillata* one Dram, Black Pitch three Ounces, *Venice* Turpentine one Ounce, Comfry Roots dry'd half an Ounce. Powder thoſe which ought to be powder'd, boil them all, ſtirring them continually, till they come to the Conſiſtence of a Plaiſter.

Manner of curing Hernia's.

THE Surgeon muſt be provided with a good Bandage, which holds very tight, and after having ſhav'd the Place, apply one or two Plaiſters if neceſſary. The Remedy muſt be taken faſting, and the Bottle ſhook before the Wine be pour'd out of it into the Glaſs, after which it muſt immediately be taken; for the Space of four Hours after which, the Patient muſt wholly abſtain from either Eating or Drinking.

It muſt be taken one and twenty Days without Intermiſſion; but if it offends the Stomach, it may be omitted one or two Days. Whilſt the Patient is taking this Medicine, he muſt wear a Truſs Day and Night, and never ſit, but always remain ſtanding or lying, and walk much. He is reſtrain'd from Riding on Horſeback, in a Coach or Chariot, but muſt always be on Foot, or in a Boat, and avoid all Manner of Exceſs, either by the Mouth or otherwiſe. He muſt wear his Truſs Night and Day for three Months after taking this Medicine. He muſt not mount on Horſeback till three Months after, and when he does, muſt ſtill wear his Truſs, becauſe 'tis thought that the Parts neceſſarily require Confirmation.

Of

Of the Diſeaſes of the Stomach, and their Cures. From Willis, St. Hilaire, Muſitanus, &c..

THE Principal Diſeaſes that affect the Stomach are, Intemperance, Inflammation, Wounds, Ulcers, Loſs of Appetite, Inflation or Wind, Vomiting, *Nauſea*, and *Cardialgia*, or Heat at the Orifice of the Stomach, commonly called the *Heart Burn.* The Intemperance of the Stomach may proceed from external Cauſes, as Exceſs of Eating and Drinking, or other Non-naturals: Or from Internals, when the Liver is affected, or there is an Indiſpoſition of ſome other neighbouring Part. Every Diſorder is the more difficult to cure, when it is join'd with ſome other Matter; and further, if the internal Coat is too much relax'd, if the Grief is old, and if it is encreas'd with the Addition of ſome other diſaffected Part.

The Inflammation of the Stomach proceeds from the ſame Cauſes as other Inflammations in general, and particularly from acrid or vicious Things received down the Gullet. *Hildanus* takes Notice of an Inflammation of the Stomach, with a Burning Feaver, and terrible Symptoms, upon the ſwallowing of a Pin. We ought not to confound the Inflammation of the Ventricle with the Inflammation of the Liver, or the ſtraight Muſcles which lye upon the Stomach; for the Inflammation of the Stomach is attended with more violent Symptoms, and the Pain is much acuter than that of other Inflammations.

We may know when the Stomach is wounded, if the Chyle iſſuing out of the Wound be much, and by the exquiſite Senſibility of the Pain, eſpecially if it be in the upper Orifice, by the frequent Bilious Vomitings, cold Sweats, *Hiccup*, Loſs of Appetite, by the Delirium and the Feaver, which overcomes all, and are the Preſages of approaching Death. But if the Wound is not mortal, Reſt is of great Importance to its Cure, and the wounded Patient muſt be conſtrain'd to lye on the ſound Side. Sleep muſt be procured, and Watching as much as poſſible prevented, the whole Body kept ſoluble or open, and the Paſſions of the Mind quieted or made eaſy.

Wounds of the Stomach are to be cured like thoſe of the more noble Parts, but great Care and Regard muſt be had to them, becauſe they conſiſt of membranous, glandulous, and nervous Parts, from whence their Wounds become ſo dangerous; therefore if they penetrate to the internal Cavity of the Stomach, they are of that Conſequence as to be pronounc'd mortal; but when otherwiſe, and that you are any Ways able to come at the Part, you muſt anoint the Part with Balſam of *Gilead*, the Artificial Balſam, the *Samaritan* Balſam, or that of Property. The Wound being thus dreſs'd, bind over it the Stictick or Appodeldoch Plaiſter, to keep the Part warm. Internally we propoſe the vulnerary Potions of Scordium, Tormentil, Ladies Mantle, Star-wort, Pyrola, Flowers of St. *John*-Wort, Roots of Comfry or Pimpernel prepared; which ought to be ſweetned with Syrup of Comfry, or Ground Ivy, with Crabs Eyes, and a few Drops of Balſam of *Peru*, or Tincture of St. *John*'s-Wort. If the Fever take Place, Diaphoreticks are to be given, with *Sperma Ceti*, ſo that the Circulation of the Juices may be promoted.

Ulcers of the Stomach ſucceed uſually Wounds, Tumours, Apoſtems, or Ruptures of the Veins, that have been produced by ſome acid and acrid Humour, or by corroſive Medicines and Poiſons, which are known by an extream ſenſible fix'd Pain that is felt on the upper Orifice, when one ſwallows any Thing too acrid, or hot, or Cold; by the *Pus* that is vomited, the ſlow Fever, conſtant Pulſe, and the entire Loſs of Appe-

tite. For the Digeſtion or Hunger depends on the fermentative Juices of the Stomach, which prick or irritate the upper Orifice thereof, and the Want of Appetite is the Loſs of that Irritation; for if the Irritation is the Cauſe of Hunger, or the Deſire of Food, it is certain that the Want of it is the Cauſe of the *Anorexia*, or Want of Appetite.

It is not proper in this Place to enter into the Philoſophical Account of this, or diſcuſs the particular Reaſons of what is agreeable to Nature, contrary to Nature, or what we call the Non-naturals, as the Choice of Air, Diet, and the like; for the Stomach is often ruin'd or deſtroy'd by Beers and ill Liquors, eſpecially Brandies, hot Spirits, and the like: So Opiates and Narcoticks do the ſame Thing, for they ſtupefy the Parts, and rob the Fibres of the Benefit of Irritation. The Fumes or Smoak of *Tobacco* likewiſe abates or ſuſpends the Appetite, by Means of its Narcotick Sulphurs, that load and ſatiate the nervous Fibrils. The *Pica* in general, according to *Etmuller*, is a deprav'd Appetite, in which there is a Deſire ſometimes of the moſt incongruous and unreaſonable Things. The *Malacia*, on the other Hand, is an exceſſive Appetite of the moſt improper Things, which are deſired with an extraordinary Longing, and which are eat with Exceſs: As for Example, when a Woman with Child would have Coals, that is the *Pica*; when ſhe longs for Herrings, or the like, with too much Deſire, that is the *Malacia*: The firſt is for Things abſurd, the laſt for Things in Uſe.

The principal Part affected in theſe Caſes is the Stomach, with its *Leven* or Ferment, next the Fancy or Imagination, the Taſte, and the Smell. The Imagination is plainly in the Caſe, becauſe their Deſires run to this and that Thing, as Chalk, Coal, Lime, *&c.* which cannot be agreeable to the Nature of the Ferment on the Stomach, but only the Fancy. The Taſte is touch'd becauſe thoſe Things which are of the worſt Reliſh, are ſwallowed with a great deal of Pleaſure, and they fancy them of the moſt exquiſite fine Flavour. Authority, as well as common Experience, informs us, that ſome will eat the moſt nauſeous Excrement, and others Tobacco Aſhes, and other Things ſcarce credible to be received by humane Appetite. In ſhort, the Smell is debauch'd, as is proved from thoſe who delight to carry old ſmoak'd Tobacco Pipes, and other ſtinking Traſh, in their Pockets to regale their Noſtrils with; and *Borellus* tells us of a young Wench that loved the Smell of Leather ſo, that ſhe uſed to chew it, and put it up her Noſtrils to ſmell to. The particular Depravity of the Ferment of the Stomach is confirm'd by an Example related by *Hildanus*, of a *Pica* proceeding from an Ulcer in the Throat, ſo that the Patient would ſwallow Herrings and other Fiſh or Fleſh ſalted and dry'd that he had an Appetite to with a great deal of Eaſe. On the other Hand, he could not ſwallow but with great Difficulty any Thing that went againſt his Stomach. The Reaſon of which is, that the ſwollowing down of the *Pus* from the Throat into the Cavity of the Stomach, was what determin'd the Ferment, and that his Fancy or Imagination was turn'd accordingly.

An exceſſive Appetite is, when we eat more than Nature requires without being ſatisfied. This Diſeaſe is divided into what we call *Appetitus Caninus*, ſo called becauſe thoſe who are ſubject to this eat, ſwallow and digeſt, and yet puke up their Food like Dogs. The other is an inſatiable Appetite or Hunger, that makes the Patient waſte or conſume away, notwithſtanding all he eats, becauſe it never digeſts, or is converted into Nutriment.

Next ſucceeds a Puffing up or Swelling of the Stomach, which comes from the Wind being pent up in the Cavity thereof, and this is called *Belching*, when the ſame Wind breaks upwards with a Noiſe that is not very agreeable. In ſhort, it ſometimes paſſes upwards, and ſometimes downwards from the Stomach, but has the moſt terrible Symptomes when its Paſſage is prevented, and it is lock'd up in the Stomach or Inteſtines, as in Hypochondriack Caſes. *Bartholin* makes Mention of a Woman who had her Stomach ſo ſwell'd, that ſhe was taken for a good while to be with Child. In which Condition nothing ſucceeds better than Clyſters of Sack and Oil of Amber, or the *Vinum Emeticum* two or three Ounces, in a ſtrong Decoction of Camomil Flowers in White Wine: So likewiſe internally a Spoonful of right

ght *Hungary* Water, now and then taken Bed-time and Riſing; or forty Drops of pirit of *Sal Armoniack* ſuccinated in a Glaſs Spring-Water.

Vomiting, according to *Etmuller*, is no other than a Convulſion of the *Pylorus*, nd conſequently of all the Stomach, caus'd too ſtrong an Irritation; for when the *Pylorus* contracts and ſhuts it ſelf cloſe, the eriſtaltick Motion of the whole Ventricle entirely turn'd, beginning from the *Pylorus* owards the Stomach, that is to ſay, towards the upper Orifice, becauſe of the circular nervous Fibres that croſs the Coats of the Stomach, which contract equally after the Contraction of the *Pylorus*. This Convulſion of the *Pylorus* is followed by he Convulſion of the Stomach, and that by the Convulſion of the *Oeſophagus*, from whence follows the Expulſion of all that is contained in the Stomach towards the *Oeſophagus*, and from thence to the Mouth

The *Nauſea* frequently precedes the Vomiting, and comes not from too great a Relaxation of the upper Orifice, as the Ancients believed, but rather from too obſtinate a Contraction, as the Moderns ſuppoſe, when the Stomach is irritated by ſomething that offends it, the *Pylorus* and upper Orifice contract themſelves, and this is properly the *Nauſea*: Which if the Irritation continue, the Conſtriction of the *Pylorus* being ſtronger, overcomes that of the upper Orifice, and ſo Vomiting ſucceeds the *Nauſea*. Hence it is evident that the *Nauſea* is a Contraction, for in all the Kinds of it the upper Orifice is uſed to contract it ſelf; from whence it comes, that in all Contractions, and eſpecially this of the *Nauſea*, the Deglutition or Swallow is difficult; for the Meat ſticks in the Gullet, without being able to deſcend, becauſe of the Conſtriction of the Ventricle.

The Irritation of the Stomach, from whence Vomiting proceeds, is eſſential when the Stomach is diſorder'd by *Idiopathy*, or Sympatick; that is, when ill by Sympathy, or Conſent. The firſt happens when the Humours or Excrements are acrid in the Stomach or Guts, eſpecially in the *Duodenum*; becauſe of the Pancreatick and Gall Duct that are there when the Stomach is inflam'd, excoriated, or ulcerated; for in all theſe Caſes it is eaſily irritated, and the Vomiting ſucceeds the Acrimony of the Juices, which mix themſelves with the *Saliva*, produces obſtinate Vomitings, which are frequent in ſcorbutick Patients. In ſhort, when the Vomiting is laſting and continual, when it will not yield to Medicines. Sometimes it happens the Vice lies in the *Pylorus*, that is entirely ſhut up or ſchirrhous'd.

Vomiting is likewiſe frequent in the Beginning of Agues or Intermitting Fevers, the Pancreatick Juice and Gall making a ſtrong Effervеſcence in the *Duodenum*, where they diſcharge themſeves, irritate the *Pylorus*, which is near, and ſo excites the Vomiting. Fat Things taken in Quantities produce the ſame Thing for theſe two Reaſons, the firſt, becauſe being hard of Digeſtion, they ſtop the ſaline Leven or Ferment and acid of the Stomach, and clog the *Viſcera*. The ſecond Reaſon is, becauſe they extreamly relax the upper Orifice of the Stomach, ſo that the Contraction of the *Pylorus* prevails by the Irritation, and the Vomiting ſucceeds the Relaxation of the one, and the Contraction of the other.

Vomiting by Sympathy or Conſent is very common; for it happens in Cholicks and the Iliack Paſſion, by the Sympathy of the Tunicles or Coats that ſerve both for cloathing of the Guts and Stomach: Vomiting prevails in the Iliack Paſſion, by a like Conſent of the Coats; ſo in Nephritick and other Diſaffections of the Kidneys that receive their Nerves from the ſame *Plexus* which ſupplies the Stomach, from whence it comes, that in the Stone in the Kidneys, the Stomach ſuffers in its Convulſive Motion. We know that Vomiting follows Wounds of the Head and Fractures of the Skull, becauſe of the Membranes of the Brain, eſpecially of the Internals, are common to the Stomach, and all the other Parts. Women are ſubject to remarkable Vomitings when they are Breeding, and when their Courſes are irregular.

Vomiting is in general, Natural or Artificial; the Natural is Spontaneous or not Spontaneous, the Spontaneous is that which Nature procures, being irritated by a vitious Matter proceeding from an external Cauſe: The other is Morbifick and contrary to Nature, when ſome Matter is thrown

off that otherwiſe could not be diſcharg'd, or Symptomatick, when it happens by ſome other Diſeaſe, or in ſhort, is critical, when Nature diſcharges it ſelf to the Relief of the Sick. The Blood is ſometimes vomited up as well as other Matter, occaſion'd by the Opening of ſome Vein in the Stomach, from what Cauſe ſoever, whether through the Indiſpoſition of the Spleen and the Opening of the *Vas Breve*, or in ſhort, from the *Pancreas*, *&c.* for a Vein or Two of the *Viſcera* being corroded by the *Lympha*, will Cauſe ſometimes a Vomiting of Blood.

The *Cardialgia* or Heart-burn, which is an intolerable Pain of the Stomach, was ſo call'd, becauſe the Grief lying at the upper Orifice of the Stomach, eaſily communicates its Paroxiſms to the Heart. If this Diſeaſe be violent, the Symptoms are terrible, it producing ſometimes a *Syncope*, and ſometimes the *Epilepſie*, as *Amatus Luſitanus* ſays he ſaw in a Woman. *Valeriola* relates an Inſtance of a violent *Cardialgia*, upon the taking a Solution of a mercurial Coſmetick, inſtead of an Emulſion of Sweet Almonds. *Platerus* tells us of a deadly *Cardialgia* from the Swallowing of *Arſenick*, and *Taber* makes mention of a ſtrong Heart-burn from eating of ſoft Cheeſe and Honey that was coagulated in the Stomach. It has been obſerv'd, that where a *Horſeleech* has been ſwallow'd in Drinking, Vomiting of Blood has enſued, and *Rhodius* tells of a *Cardialgia* caus'd by a *Horſeleech* that ſlip'd down the Throat, upon its being apply'd to the Noſe, and the Patient was cured by Drinking of Salt-water, becauſe Salt is deſtructive of the *Horſeleech*, for when they are apply'd to the Fundament to draw Blood, if it happens that one of them ſhould creep into the Inteſtine, it will cauſe grievous Symptoms, which are eaſily reliev'd by a Clyſter of Salt and Water.

It is obſervable, that the *Cardialgia* does not always affect the interior *Epigaſtrick* of the *Abdomen*, but ſometimes the Back, not only on the ſuperior Region of the Loins, and towards the lower *Vertebræ* of the Breaſt, where the *Pancreas* lies under the Stomach; but it riſes higher, and the Heart-burn is in the Gullet even as high as the Shoulders, where it ſhows it ſelf by a convulſive Motion. It is true, that in the lower Part it is more acute and piercing than t below: The Cauſe is eaſily diſtinguiſh whether it proceeds from the Humou Worms, the Conſent of the Kidneys, ſome other Part. We ought to diſtingu rightly, leſt we take the Heart-burn for Cholick, and the Cholick for the Hea burn. *Schenkins*, gives us an Inſtance ſome Phyſicians who treated a Patient w complain'd of Pain about the anterior R gion of the Stomach, as if it had been Heart-burn, and apply'd a Clyſter that liev'd it, which it could not have done h it been the *Cardialgia*.

Such Remedies as are uſually apply'd theſe Caſes, are ſuch as have Power to ſorb the acid ſour Juices of the Stomac which are generally ſuppos'd to procure *Heart-burn*, which we find is a frequ Conſequent of eating unripe and cru Fruits, *&c.* Therefore Crabs Eyes, Co Powder of Oyſter-ſhells, burnt Hartsho Crabs Claws, and other Teſtaneous Pow ders, together, with Chalk, Bole Arm niack, ſeal'd Earth, Dragon's Blood, a the like ſoft Earths, are chiefly in uſe for the Cure of this ſlight, but troubleſom and almoſt inſupportable Diſeaſe.

For the Indiſpoſitions, Pain, and Ulcers of the Stomach.

THE Cure of the Diſorders of the Stomach conſiſts in the Tempering of the Acrimony of the Humours, and the irregular Fermentations that produce Heat, or diſſipating and attenuating the pituitous or viſcous Humours, which occaſion a cold or moiſt Stomach, which is done by the following Methods. Firſt, Take Coriander-ſeed prepar'd, half an Ounce; Species Diaſarutali, Two Drams; Powder of Roſes, one Dram; Crabs Eyes, two Drams; prepar'd Steel, ſix Drams; Sugar diſſolv'd in Roſe-water, as much as will ſuffice to make it into an Electuary: To be taken, the Quantity of a Nutmeg, Morning and Evening, with Six Spoonfuls of the bitter Draught after it.

In the *Cardialgia*, where Vomiting is requiſite, give the *Vinum Benedictum*, or *Rolandus Aqua Benedicta* and Wormwood-Wine, infus'd upon the Antimonial Cup;

elſe purge with the *Pilulæ Aleophanginæ*, ith Scammony, Two Grains of *Laudanum*, d a few Drops of Oil of Wormwood. There an admirable Syrup for Pains of the Sto-ch, made of Roman Wormwood and momil, of each alike; with a Dram of hite Frankincenſe boil'd in Water and eeten'd up to the Conſiſtence of a Syrup, hich may be taken with ſome Drops of *udanum* by it ſelf, or in a bitter Draught de of Mint, Gentian, Cinnamon and entury, boil'd in White-Wine. Make a lſam to anoint the Region of the Stomach us: Take of diſtill'd Oil of Camomil, e Dram; Balſam of *Peru*, half a Dram; il of Mace and Cloves, half a Scruple; il of Nutmegs by Expreſſion, Twelve ops, mix. A Powder for the Heart-burn d other Diſorders of the Stomach: Take, nches of Amber, Bole, ſeal'd Earth, Red oral, *Lapis Hæmatitis*, of each a Dram; agon's Blood, Gum Tragacanth, of each lf a Dram; Poppyſeeds, Hypocyſtis, Fran-incenſe, Sarcocolla, of each a Scruple; gar of Roſes or Loaf Sugar, one Ounce; 'em for a Powder, whereof a Dram or o is to be taken every Day in a Glaſs of ater or otherwiſe.

For Nauſea and Vomiting.

THE Cure of theſe conſiſts in removing, or at leaſt overcoming the Cauſe that itates the Stomach to this Degree, by *ematick* and kindly reſtringent Medicines, ch as follows, *viz.* Salt of Wormwood, a uple given in Lemon Juice, is a power-l Remedy againſt the Nauſea and Vomi-g: Likewiſe a few Drops of the Oil of nnamon, or 20 or 30 of liquid *Lauda-m*, given in any proper Vehicle, as Cin-mon, Saffron, or compound Mint-Wa-r; or in the following: Take Cloves groſly powder'd, half a Dram; Red-Roſes, a Pugil, Cinnamon in the Stick; boil 'em gently in a Gill of Wine, to the Conſumption of a Third, the Doſe is Two Spoonfuls: A little Spirit or Oil of Vitriol mix'd in Wormwood Water or Juice of Mint, is very efficacious; or this Potion, Take Two Ounces of Mint Water, Six Drams of Cinnamon, an Ounce of Juice of Quinces, Ten Drops of Spirit of Saffron, Four of Oil of Cinamon. Forty Drops of liquid *Laudanum*, make a reſtringent Potion, to be taken Two Spoonfuls every Hour.

Foreſtus's Method of Stopping the Vomiting of Blood, and diſſolving the coagulated Matter, us'd to be thus: Take, Waters of Shepherd's Purſe, Poppy, and Plantane, of each one Ounce; Troches of *Carabe* and ſeal'd Earth, half an Ounce of each; for an aſtringent Potion; or elſe, Take Two Ounces of Plantane Water, Six Drams of Cinnamon, half an Ounce of diſtill'd Vinegar, Red-Coral prepar'd, half a Dram; Dragon's Blood, half a Scruple; Crabs Eyes, Two Scruples; one of Antimony Diaphoretick; Twenty Drops of *Laudanum*, an Ounce of Syrup of Myrrh; make a Potion: So Caſtor mix'd with Mint Juice is a ſingular Remedy, and theſe Paſtiles made of Galingal, Saffron, Spikenard, Roſes and Maſtich, of each Two Scruples; Aloes, half a Dram; Opium, a Scruple; make Paſtiles with Juice of Flea's Wort, whereof give a Scruple in the Morning faſting, or elſe adminiſter the following Troches. Take Aniſeed, Carduus and Citron, of each a Scruple; Balm and Lemon Peel, of each half a Dram; Red Coral, Galingal, Mace and Cinnamon, of each a Scruple; Burnt Hartſhorn and Bezoar, of each the ſame: Sugar and White Wine, enough to make them up. Doſe about a Dram in a Morning faſting.

Of

Of the Diſeaſes of the Inteſtines. *From the ſa Authors.*

THE chief Diſeaſes that happen to the Inteſtines are, Inflammations, Ulcers, Wounds, Tumours, as the *Bubonocele* and *Enterocele*, Worms, Cholick, the Iliack Paſſion, commonly called the Twiſting of the Guts, *Cholera Morbus*, *Teneſmus*, the Conſtipation or Cauſtiveneſs of the Belly, Diarrhea, Dyſentery, and Hemorrhoides. The Inflammation of the Guts, conſidering their Coherence with the Stomach, are inflam'd from one and the ſame common Cauſe oftentimes, but oftner from the Iliack Paſſion or *Miſerere*, the *Hernia* or Rupture, and from external Contuſions. This Malady is eaſily diſcovered, for upon the Part inflam'd one may perceive a round hard Tumour, which the Ancients called *Chordapſus*, becauſe the Guts ſeemed to be twiſted and hard as a Cord. They feel from the ſame Place a violent Pain, the Belly is bound, and the *Fæces* are caſt up at the Mouth by the Inverſion of the Periſtaltick Motion of the Guts; but the Symptoms are more ſharp and dangerous when in the ſmall Guts, but ſlower and gentler in the large ones.

The Inflammation of the Guts is at all Times dangerous, but moſt fatal when in the *Ileon*; for the Inteſtines are very liable to *Gangrene*, and the *Sphacelus*. The Inflammation of the Fundament comes from a Contuſion or violent Percuſſion by ſome external Cauſe, or the Irritation of ſome ſharp and acrid Things, as Pepper, Vitriol, or the like, being applied. Sometimes the Cauſe is internal, as from the Piles, which may occaſion an Inflammation in the *Inteſtinum Rectum* and the *Anus*. We may know this from Pain, with Pulſation upon the Part, caus'd by the Hemorrhoidal Arteries, by which the quick Motion of the Blood excites that Senſation, and this, if ill treated, degenerates into an *Abſceſs*, and that into a *Fiſtula*, which ſometimes penetra into the Bladder, whence the Excrem and Urine iſſue together.

The Ulcers of the Guts uſually ſucce an Inflammation ſuppurated, and ſometi they are caus'd by the acrid and corro Humours that flow from the Liver, t Spleen, or ſome other neighbouring P They are ſcarcely diſcernable from the I flammation, except that the Pain is m acute, and that the Patient void ſome S of purulent Matter, and that the Feve leſs; for Ulcers that are inveterate, and tended with a conſtant Pricking or Shoo are very dangerous, and more likely to b mortal. The *Fiſtula* which is apt to ſucce theſe, is a *Calous Ulcer*, that is deep an hollow like a Pipe, which from a narrow Entrance ends in a large Bottom, that con veys along it an acrid and virulent Matter it ariſing from the more ſaline and cauſtick Particles of the Blood. But of this more fully when we come to treat of the Diſeaſes of the Privy Parts.

If the Inteſtines are wounded, and that the Wound be ſmall, there happens Faintings and Loſs of Spirits, Want of Reſt Convulſions, and the Fever; but if the Sick vomit Blood, or purge it off by Stool and that the *Fæces* flow out at the Wound it's certain that it is large in the Gut, which muſt be deem'd mortal, their Re-union being ſo difficult, becauſe of the Periſtaltick Motion, and that the Chyle and Excrements iſſue from the Wound, and make a Putrefaction in the lower Belly. Some Surgeons, ſays Mr. *Dionis*, allow the Suture or Sowing up of the large Inteſtines, and inhibit that of the ſmall when wounded but I ſhould be glad they would ſhow how to ſow the great Guts, which we know to be ſo firmly fix'd to their Place, that they never come out through any Wound.

the Practitioners cannot help admitting Sutures of the Inteſtines, they muſt grant them to be rather us'd in the ſmall ones, eſpecially in the *Jejunum* and *Ileum*, ſince they are the only two Guts that cannot ſtart out of the Belly.

There are others that will neither ſew the great nor ſmall Guts, alledging a great Abſtinence to be a more ſecure Way than Suture. I allow, that after Suture a very ſparing Diet is neceſſary; but if the Wound be but a little wide, the periſtaltick and perpetual Motion of the Guts will every Moment ſeparate the Lips of the Wound, if not faſten'd together by Suture; ſo that their Reunion cannot be accompliſh'd by Suture alone. 'Tis yet true, that when one of the great Guts is wounded, we are oblig'd to depend ſolely on this Means, by reaſon of the Impoſſibility of applying any Suture to it; and indeed (ſays the ſame Author) I have cured ſeveral Patients, whoſe great Gut voided the fæculent Matter iſſuing through the Wound, by confining them from all other Subſiſtance, but two Spoonfuls of Jelly Broth, made of a Fowl and the Yolk of an Egg, for the firſt Days. What happen'd to a Soldier in the Invalids, is too ſingular to account to any Inſtance in Practice, ſince it was Nature alone which wrought his Cure, in which the Induſtry of the Surgeon had no Part. She her ſelf provided a Sink through the Wound, to which the wounded Gut ſticking faſt, he daily through that Aperture voided his Excrements, which paſſing involuntarily, he was forc'd to keep a Tin Box at that Place to receive them. He no longer voided them by the *Anus*; and what thus came from him thro' the Wound, had no Stench, by reaſon the pure Chyle was not yet wholly ſeparated, and that the groſſer Sulphurs had not Time to diſcover themſelves by the Fermentation which attends evacuated Excrements. The Ancients forbid Gliſters in Wounds of the Guts, and there are ſome Moderns which approve them. Theſe laſt ſay, that theſe Remedies are cooling, and ſerve inſtead of a *Balneum Mariæ* to calm the Emotion of the Blood, and ſtop the Progreſs of the Symptoms. Theſe two Opinions are eaſily reconcilable, being both founded on Reaſon. Gliſters ought not to be applied when 'tis the great Guts that are wounded, becauſe they will run out at the Wound, and thereby hinder the Reunion; but they ought to be given when the Aperture is in the ſmall Guts, becauſe they not being able to reach to the Wound, by reaſon of the *Valvulæ* of the *Cæcum*, can do no Hurt.

The *Bubonocele* and the *Enterocele* are two Kinds of *Hernia's* or Tumours occaſion'd by the falling down of the *Ileum* into the *Anus* and the *Scrotum* or Manly Purſe, the Gut deſcending from its Situation by the Dilatation or Rupture of the *Peritonæum*. We know the *Bubonocele* by the Tumour being round, lying in the *Anus*, and that when it is preſs'd, it will eaſily return again; and likewiſe the *Enterocele*, by the Hardneſs and Inequality of the Tumour, by its being in the Cod, by the Vomiting that is us'd to attend it, and by a certain Noiſe that happens when the Gut is return'd into its natural Place. Theſe two Maladies are very troubleſome and inconvenient; but as I have ſaid ſomething of their Cure already, I ſhall omit what might be ſaid further, as thinking that ſufficient.

The Conſtipation or Coſtiveneſs of the Belly proceeds either from the Guts themſelves, or the Matter contain'd in them, ſo that there is no Excluſion of the *Fæces*. The firſt happens, when the Inflammation of the Guts is ſo ſevere, that there is Danger of a Gangrene: The ſecond, when there is an Inverſion of the periſtaltick Motion: The third proceeds from an Inſenſibility or *Paralyſis* in the Inteſtines, when they have loſt their Motion, or lie idle, or elſe from an Apoplexy, *&c.* in which Caſe they will not be reliev'd by any Kind of Clyſter, or other Means, whence Death naturally enſues: Or in the next Place, the Cauſe of Conſtipation of the Inteſtines may proceed from the Matter contain'd in them, when nothing deſcends to the *Inteſtinum Rectum* to irritate, becauſe of the Smallneſs of the *Fæces* from the little Nutrition receiv'd; or when it is ſo harden'd and bak'd by the Heat of a Fever, or otherwiſe, that the Spring of the periſtaltick Motion is too weak to protrude it forward; or laſtly, when the fæculent Matter is too glutinous, and the Guts are

not ſufficiently irritated, or the *Fæces* diluted with the Gall, that is ſtop'd from flowing into the Gut, as in the Jaundice, *&c.*

The *Iliack Paſſion* or *Miſerere* is an Expulſion or Throwing out of the Excrements by the Mouth; the Cauſe of which is undoubtedly the periſtaltick Motion of the Guts being inverted or turn'd backwards; and the *Miſerere* is to the Guts, as Vomiting to the Stomach; for when the Inverſion of the periſtaltick Motion begins at the *Ileon*, and towards the Beginning of the *Colon*, where the uſual Seat of this Diſeaſe is, that is the *Miſerere*. To underſtand this, we ought to conſider the Inteſtines as one Pipe of the ſame Subſtance and Texture, from the upper Part of the *Oeſophagus*, to the End of the *Inteſtinum Rectum*, where it diſcharges it ſelf at the Fundament. All this Pipe is no other than a membranous Subſtance, compos'd of circular nervous Fibres, which croſs obliquely. This Subſtance is broad in ſome Parts, and narrow in others. The broadeſt Part is the Stomach, the ſtraighteſt the Gullet; the Inteſtines are thin and thick. In the natural State of the Body, there is no other but a continued Motion downwards, from the Gullet to the Fundament, to puſh forward the Aliment with a periſtaltick and ſucceſſive Motion; ſo if that Motion is chang'd in any Part, and it turn upwards, then the Matter or *Fæces* cannot be expelled by the *Anus*. When the periſtaltick Motion is ſtop'd, and begins to work quite contrary from the *Pylorus*, this is a Vomiting; if it is continued from the Inſertion of the *Ductus Cholidochus* and *Pancreaticus*, it is the *Cholera Morbus*; if it begins in the *Ileon*, it is the *Miſerere*. Sometimes the Motion is inverted quite from the Fundament, and then Clyſters, and the like, work quite up at the Mouth.

The Occaſion of the Compreſſion and periſtaltick Motion being inverted, is the Irritation of the Guts, and the Stoppage of their Motion downwards; for when the Gut is irritated in any Part, it makes its Preſſure or Force ſucceſſively downwards, which if any Thing oppoſes, the Irritation ceaſes not to continue, but alters its Motion upwards, and the Matter contain'd in the Inteſtines aſcends; and the Cauſes that procure theſe Irritations of the Guts, and ſtop their ſucceſſive Compreſſion downwards, are ſo many and various, that it would be endleſs to enter into a Detail of them. *Etmuller* rejects the *Twiſting* of the Guts, a Name often given to the *Iliack Paſſion*; and ſays, it is impoſſible that the Guts, being tied to the *Meſentery*, can ever be twiſted, as it is demonſtrated by *Van Helmont*; and therefore to call it (as the *Latins* do) *Valvulus*, is ridiculous. But the Guts to run one into the other, from the ſuperior to the inferior, or from the inferior to the ſuperior, is pretty common, as *Sylvius* has obſerv'd in his Practice, where he has aſſign'd two Cauſes for this: The firſt is Wind, that dilates the ſmall Guts more in one Part than another: The ſecond is the Motion or Agitation of the Patient turning from one Side to the other.

The *Cholera Morbus* is a Diſeaſe in which the Excrements are plentifully diſcharg'd upwards and downwards with a great deal of Violence and Force. The immediate Cauſe, according to *Etmuller*, is a ſtrong Irritation of the Inteſtines, occaſion'd by the Acrid Heat and Fermentation of the Excrement. The Seat of the Irritation is at the End of the *Duodenum*, and the Beginning of the *Jejunum*, near where the two Ducts of the Gall and *Pancreas* fall in; for theſe two Juices being contrary to each other, and joining in this Part, can do no leſs than create a great Efferveſcence, and powerfully irritate the Gut by their ſaline Acrimony; whence the Guts contracting themſelves by a convulſive Motion, become the Spring of the two oppoſite Motions; the one of which is natural, that is downwards; the other contrary to Nature, being upwards. By the latter the Matter regurgitates into the Stomach, and from thence preſs'd continually upwards, flows out of the Mouth by Vomiting.

The remote Cauſe is the violent Fermentation, Corruption and Change of the Mass of Blood, caus'd by a vicious and foreign Ferment, which appears from the Nature of this Diſeaſe, which moſt frequently happens in Autumn, when the Fruits of that Season are apt to vitiate the Digeſtion of the Stomach, and procure the *Cholera* by exciting the Fermentation of the Blood, to which they are very much diſpos'd; and it is by the Fermentation of their Juices, ſo contrary to the Nature of the Blood, from

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hence arise those Feverish Symptoms, as well in the Pulse, the Heat of the Blood, and Head-ach. The Ferment of the Mass of Blood in the *Cholera Morbus* is sometimes malignant: Witness the terrible and dangerous Symptoms which attend it; as the *Lipothymia*, extreme Chilness, a small nimble Pulse, *&c.* In a Word, all the ill Symptoms that follow the malignant and violent Purging after Antimony, are found in the *Cholera*; so that we may judge the Poison of Antimony is an utter Enemy, and contrary, to the vital Functions of the Body. In short, malignant Fevers join to the *Cholera* in its Beginning, and sometimes very dreadful.

Diarrhœa comes from the Mass of Blood discharging it self by Fermentation from the Excrements in the Intestines. It has different Denominations from the Variety of the *Faces*: Sometimes it is pituitous, sometimes serous, sometimes purulent, when the *Pus* flows downwards. All the other Kinds happen when the Mass of Blood is separated from the Excrements by Fermentation, and the purulent comes from the Rupture of some Abscess. We may observe for Example, that the *Pleurisie*, after Suppuration, is follow'd sometimes with a purulent *Diarrhœa*. Likewise in the Abscess of the Liver, and Ulcers of these Parts, the *Pus* flows sometimes by Stool in the Nature of a *Diarrhœa*. The Habit of the Body is sometimes liable to a *Diarrhœa*, to which those who transpire little are subject, because what is thereby retain'd in the Body, precipitates by Stage, as it is ingeniously observ'd by *Gabelchoverus*: Those (says he) who have thick Skins, go more frequently to Stool than those who have their Pores open.

Diarrhœa's are either Critical or Symptomatick. The Critical are often healthful to the Patient; but the Symptomatick, which succeed a Disease, are always, or very often, mortal; as that which follows a *Peripneumonia* is very dangerous, and this is what we ought to stop presently, or else bring it under such a Government, as it may not exceed Nature.

The *Lientery* is a Looseness, or a Discharge upwards and downwards, whereby the Aliment is pass'd off by that Time it is well taken, or before it be half digested. This Disease (says *Etmuller*) comes from the Leven or Ferment of the Stomach being entirely loss'd or blunted, or because the *Pylorus* is too much relax'd, and the other Parts of the Ventricle at the same Time too strongly irritated, that instead of retaining the Aliment, it lets it slip away. The *Scurvy* is sometimes attended with the *Lientery*, as *Barbette* first of all observ'd, and a great many Scorbutick People throw up their Meat as soon as taken. This Evil is very difficult to cure, and obstinate in the *Scurvy*. *Etmuller* believes that it comes from a Corruption of the *Saliva*, which is very probable, because the Gums of such are full of Ulcers, and the *Saliva* being swallow'd by Mastication into the Stomach, and first well impregnated with the corrupted Juices of the ulcerated Gums, causes that sudden Irritation. A *Lientery* that lasts long, produces an *Atrophy*, Phtysick, and consequently Loss of Strength.

The *Cœliack Flux* is a Disease in which the Food is digested in the Stomach, and comes away by Stool in the Nature of Chyle. There are two Sorts of this according to *Sylvius*. The first, is when the Chyle is not separated in the Intestines, and when the Excrements are whitish, and both appear mix'd together: The second, is when the Chyle is separated with the Excrements, but not receiv'd by the Lacteals, it then flows along with the *Fæces*. All this Vice consists either in the Bile, which cannot make a Separation of the useful from the useless Parts; or in the Pores of the Glands of the Guts, which are not able to strain the Chyle into the Lacteals for their Distribution.

All Authors understand by the *Dysentery* any Flux of Blood that comes by the Fundament, except the *Hæmorrhoides*. They establish three Kinds of *Dysenteries*. The first, is when the Blood in a natural, but superabounding State, flows by the Mouths of the Veins that empty themselves into the Guts. This Disease is common to such as have any Member cut off upon the sudden stopping of the Blood, and to Women who have their Courses irregularly suppress'd. The second Sort is attributed to the Weakness of the Liver, call'd the *Hepatick Flux*. The third Kind of *Dysentery*, is when the Intestines are corroded, excoriated, and sometimes exulcerated, and that the Blood comes

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All Authors underſtand by the *Dyſentery* any Flux of Blood that comes by the Fundament, except the *Hæmorrhoides*. They eſtabliſh three Kinds of *Dyſenteries*. The firſt, is when the Blood in a natural, but ſuperabounding State, flows by the Mouths of the Veins that empty themſelves into the Guts. This Diſeaſe is common to ſuch as have any Member cut off upon the ſudden ſtopping of the Blood, and to Women who have their Courſes irregularly ſuppreſs'd. The ſecond Sort is attributed to the Weakneſs of the Liver, call'd the *Hepatick Flux*. The third Kind of *Dyſentery*, is when the Inteſtines are corroded, excoriated, and ſometimes exulcerated, and that the Blood comes

with great Gripings, and is mix'd with a whitiſh Mucilage, and a purulent Matter. This laſt Kind bears the Name of the *Dyſentery*, and is properly a Flux of Blood with Gripes, which differs from the other Fluxes of Blood that are without Gripes.

The *Dyſentery* is diſtinguiſh'd into a Kind or Benign One, and into a Malignant. The Benign is moſt commonly without a Fever or Contagion, and is not more ſevere in one Place or Country than another: The Malignant is commonly join'd with a Malignant or Peſtilential Fever. It is Epidemical, deſtroying whole Provinces, and multiplying its Species by a plain Contagion. The *Benign Dyſentery*, or ſuch as is ſlight, comes from an acrid corroſive Juice that gnaws upon the Inteſtines, which proceeds from the Corruption of the Aliment upon the Stomach, that degenerates into a Sowrneſs; or at leaſt from the Pancreatick Juice being too corroſive, or that it is not well temper'd by the Bile; this Kind of *Dyſentery* rarely proceeding from the Maſs of Blood, but owes its ſole Origine to the Corruption of the Matter contain'd in the Inteſtines. This we know by Experience, that the Autumn Fruits, which are ſubject to decay, and gain an Acidity or Sowrneſs thereby, procure the Bloody Flux, eſpecially Melons, Grapes, Plumbs, and Honey, or other ſweet Things, as *Mæbius* relates. The *Malignant Dyſentery* requires more Care and Application in examining into the Nature of the Contagion, and the Seat thereof, with ſeveral other Particularities which properly belong to the Fluids, deſign'd to be fully treated of, together with all the general Diſeaſes of the Body, in the Third Volume of this Work.

The *Teneſmus*, according to *Etmuller*, is to the *Inteſtinum Rectum* as the *Dyſentery* is to the other Guts. It is a continual Motion to go to Stool, without being able to do any Thing, or very little. The Occaſion of this is a conſtant Irritation of the *Rectum*, which makes theſe Contractions, and excites theſe Motions; for the leſs Matter there is in the great Gut, the more Provocation there is to diſcharge it. This Irritation is either Eſſential or Symptomatick, ſuch as is to be met withal in Nephritick Pains, by reaſon of the Nerves of the *Meſenterick Plexus*, that communicates its Branches to the Kidneys and the *Rectum*. The Stone in the Bladder, at its Entrance from the *Ureter*, cauſes ſometimes the *Teneſmus* in Men, irritating by its Weight, and pricking upon the great Gut. Women in Labour ſuffer a *Teneſmus* from the *Matrix* lying upon the Gut. An Eſſential or Natural *Teneſmus* proceeds from an acid Mucilage, or a viſcous ſowr Pituit, that corrodes, excoriates, and in ſhort, exulcerates the *Rectum*. The Inflammation of the *Anus*, and the Worms call'd the *Aſcarides*, that gnaw and prick the Gut, likewiſe produce the *Teneſmus*, which is common in the *Dyſentery* and violent Purging, becauſe of the acrid corroſive Nature of the *Fæces* that cling to the *Rectum*, and excoriate it.

The *Hæmorrhoids* are the opening of the Hæmorrhoidal Veins in the Fundament. Theſe Veins are of two Sorts, by reaſon of their Inſertion into the great Gut, the upper or internal, and the lower or external. The upper or internal come from the Meſenterick Branch of the *Vena Porta*, by which the Ancients thought that the Spleen purg'd it ſelf in the Evacuation of the *Hæmorrhoids*, which is contrary to the Laws of Circulation. The inferior or external comes from the *Vena Cava*, to wit, from the Hypogaſtrick Branch, which ſupplies the Neck of the Womb with Blood for the Menſtrual Flux: But I ſhall ſay no more of this Diſeaſe, till I come to the Privy Parts, and thoſe of Generation.

The Colick is a Pain of the Guts, univerſally ſo call'd by affecting any Part of the Guts, or elſewhere within the Circumference of the *Abdomen*, but more particularly nam'd the Colick from the Gut *Colon*. When the ſmall Guts are affected, as the *Jejunum* or *Ileon*, it is call'd the *Iliack Paſſion*, which is ſometimes confounded with the Colick, but may be thus diſtinguiſh'd; for the Pains that ſeize the Middle of the Belly, and about the Navel, without affecting the Back, and the whole Circumference of the *Abdomen*, are the Iliack Paſſion; but the Pains that tranſverſe the upper and lower Part of the Belly, and all around it, are always what we call *Colick Pains*, which are differently denominated according to their different Situations.

The

The *Hypochondriack Pain*, according to *Etmuller*, is that which is particularly felt in the Left *Hypochondria*, under the Baſtard Ribs, which is a cruel obſtinate Pain, uſually attributed to the Spleen; but thoſe who conſider the Nature of that *Viſcera*, will ſoon be ſatisfy'd it is not capable of producing any acute Pains, but ſuch as are heavy, dull, ſlow, and almoſt inſenſible; therefore thoſe ſharp and piercing Pains that attack this Part, muſt belong to the Guts, ſometimes perhaps to the *Jejunum*, but moſt commonly to the *Colon*, as *Fabricius Hildanus* has plainly made appear.

Pains in the *Loins* or *Back* are very common, and ſometimes confounded with thoſe of the Stone in the Kidneys, becauſe the *Duodenum*, which takes its Riſe from the *Pylorus*, runs crooked under the Stomach, and reſts upon the Right Region of the Loins. Likewiſe the Pains which ſeize the *Duodenum*, towards the Beginning of the *Jejunum*, is ſenſibly perceiv'd upon the Loins and Back, and that is the true Reaſon why they call them *Back Pains*, though the Part affected be really the End of the *Duodenum*, and the Beginning of the *Jejunum*.

There is a burning hot Pain ſometimes perceiv'd in the Right *Hypochondria*, towards the Region of the Loins, juſt upon the Place where the Pancreatick and Gall Duct falls into the *Duodenum*. This Pain, as *Etmuller* deſcribes it, is produced by the too Oilineſs of the Bile, which makes a vicious Effervescence with the Pancreatick Juice, from whence proceeds the Heat and Burning ſo troubleſome to the Patient. Beſides, there are other burning Heats perceiv'd in the *Abdomen*, as well as other Parts, but which are join'd with a Senſation of the Pulſe, and ariſe from the Inflammation of ſome Inteſtine; for when the Blood ſtops in the Capillary Veſſels of the Guts, they diſcharge themſelves into their *Parenchyma*, where there is produc'd an Inflammation inſeparable from the Pulſation.

Sometimes there is a cold Pain felt in the Belly, or a ſhivering inſupportable Chilneſs, that holds pretty long, eſpecially in the Beginning of Intermitting Fevers, which proceeds from a quite contrary Cauſe with the other, to wit, from the Pancreatick Juice being too acid or too auſtere, or endow'd with ſome other exceſſive Sharpneſs, which meets with too little Bile in it, or too ſmall a Quantity of Oil, or elſe is embaraſs'd with a great deal of viſcous Matter in the *Duodenum*, which makes an Effervescence, but with a Senſe of Cold, the ſame with Spirit of Vitriol pour'd upon a volatile Salt, that makes a Ferment that is notwithſtanding cold; and this Cold is felt, as well in the Region of the Loins, as in other Parts in the Guts, according as the Pancreatick Juice is leſs acid or abounding.

There is a fix'd piercing Colick Pain, that is like the Pricking of the Guts, which comes from a viſcous acid Mucilage clinging to ſome certain determinate Place, particularly in the *Colon*, under the Left *Hypochondria*, or in the Cells or Folds of the ſaid Gut, where it is proper to be lodg'd. This viſcous acid Mucilage adhering to the Inteſtines, cauſes a continued fix'd Pain by reaſon of its Viſcoſity, and a ſharp one from its Acidity, this ſeizing frequently both *Hypochondria's*, and is the moſt common Colick.

The Pain that is attended with a Diſtention, or a Kind of tearing off the Part as if rent in Pieces, proceeds from Winds that ariſe from the vitiated Fermentation of the viſcous Matter with the acid, which is a Subject for the Generation of Wind, according to *Van Helmont*. Wind pent up in the Guts, procures various Motions, which beget Pain and Gripes, which is the next Cauſe of the moſt common Colicks. There is a very exquiſite Pain of Contorſion, that is like the twiſting or ſqueezing the Inteſtines, that is frequent in the *Colon*, and produces Convulſions, and a ſpaſmodick Contraction in the Guts. In ſhort, there is a wandring or flying Pain, that is ſometimes attended with gnawing, and ſometimes with other Symptoms, which uſually are Worms, that are commonly lodg'd in great Numbers in the Guts. The Cauſes of the Colick in general are Two: The firſt is the Matter contain'd in the Guts; the ſecond is the ſpaſmodick Convulſion, which affects the Guts with dangerous Contorſions and Contractions. Theſe two Cauſes often meet together. When any Thing acrid pricks the Guts, painful and convulſive Contractions preſently ſucceed.

There

There are, beſides theſe ſingle Colicks, complicated ones, ſuch as Scorbutick Colicks in the *Abdomen*, Nephritick Colicks, and the like; which are not dangerous in themſelves, but as they become obſtinate and continual, they become mortal. Thoſe occaſion'd by the Matter contain'd in the Guts, are much gentler than ſuch as proceed from Convulſions, which are ſometimes follow'd with the *Epilepſy* and *Cephalalgy*, according to the Obſervation of *Hofferus* and *Tonnerus*; likewiſe Palſies, Contractions of the Limbs, *&c.* ſometimes ſucceed convulſive Colicks.

Worms are bred in the Guts from a ſoft viſcous Slime, which corrupts by a prætternatural Heat introduc'd into the Parts; and theſe are either round and long, ſhort and broad, or ſlender and round, ſuch as thoſe that are call'd *Aſcarides.* This Diverſity of Shape and Species depends on the Diverſity of Forms which they receive from the ſeveral Seeds in the corrupted Maſs from whence they are bred. Infants are much more ſubject to theſe Worms than Adults: They are much moiſter, and more apt to Corruption. One may know that there are Worms in the Guts, by the frequent Twiſtings and Gripes therein, the Lienterick Flux, Weakneſs of the Parts, pale Viſage, Eyes bloated or ſunk, the pinching in of the Noſe, and the gnawing of the Stomach, eſpecially when ſome Time from eating; for theſe Worms wanting their Subſiſtance, will bite upon, and ſuck, the Guts; and raiſe a dry Cough, that is very troubleſome. Sometimes they ſtick to the Orifice of the Stomach, and other Entrails, cauſing Faintings, and *Syncopes* of the Heart, and Epilepſies. In ſhort, when they fix upon the *Diaphragm*, they cauſe convulſive Motions, a Difficulty of Breathing, and Suffocations, of which Accidents we ſee ſeveral Infants die.

Of the Diſeaſes of the Guts, and their Cures; eſpecially of an Inteſtinal Rupture from a Relaxation of the Peritonæum. *Communicated by Mr.* Tho. Garlick, *Surgeon, at* Wolverhampton.

A MAN about 70 Years of Age, having for many Years a ſmall Inteſtinal Rupture in his Groin by a Relaxation of the *Peritonæum*, in the Year 1705. (by ſome more than uſual Exerciſe of Body) it grew painful. He was ſeiz'd with violent Vomitings, nothing paſſing by Stool, and in two or three Days (the *Peritonæum* burſting) the Inteſtines deſcended without Controul into the *Scrotum.* In this Condition he ſent for me; but being in *Lancaſhire*, he ſent for Mr. *S----t*, Surgeon, (ſince deceas'd.) He found him as above, his *Scrotum* violently inflam'd, bliſter'd in ſeveral Places, and tending to a Mortification. He preſently made a large Inciſion into the Part, and diſcharg'd a Quantity of a grumous extravaſated Blood, and therewith a deal of hard Excrements, which (by the Conſtriction of the Inteſtines) had been ſtop'd in their Paſſage by Stool. His Caſe being thus deſperate, another Surgeon was ſent for, who dreſs'd up the Wound with the common Digeſtive *ex Tereb. &c.* and told them, he did not think he could poſſibly live. In a little Time I returning Home, was again ſent for to him. I found him in his Bed, the Wound about ſix Inches in Length, and the Inteſtines return'd into their proper Places; but from the Beginning (they told me) he had had no Stool but what came through the Wound, and that in ſuch a prodigious Manner, that the Dreſſings could not be kept on three Minutes without

being foul'd, and forc'd off by the Excrements. They ſhew'd me at leaſt a Dozen of Clouts ſo foul'd in leſs than twelve Hours; and indeed (whilſt I was preſent) I obſerv'd them (almoſt conſtantly) to iſſue forth with a rumbling Noiſe: Upon which Conſideration, I adviſed only the keeping clean Rags to the Wound, to be renew'd as oft as they were foul'd; and applied my whole Endeavours to reſtrain the Flux, and ſupply the Place of proper Externals by Balſamicks internally adminiſtred, to which Purpoſe he took as follows: *viz.*

Take, *Lucatellus* Balſam, Conſerve of Roſes, of each two Ounces; Cinnamon in Powder, three Drams; Powder of Tormentil Root, two Drams; Syrup of Quinces, as much as ſuffices.

Of this he took the Quantity of a Nutmeg every Hour, which ſomething abated the Looſeneſs, and every Night a few Drops of *Laud. liquid. Cydoniat.* A few Days after I ſent him a vulnerary Drink, made with Agrimony, Scabious, Mouſe-Ear, *&c.* decocted in Water, and ſweeten'd with Honey, which I found after a while again increas'd his Looſeneſs, ſo that we left that off, but continued the Electuary. His Diet was nothing but Haſty-pudding, made with Wheaten Flower in Milk, and his Drink a ſmall Ale, and that very ſparingly; for I obſerv'd, that all Liquids would at any time increaſe his Looſeneſs. By theſe Means, in a little time his Excrements gain'd a better Conſiſtence, and we ſoon after left off the Aſtringents, but kept ſtill to the *Lucatellus* Balſam, with which (in great Quantities) he was conſtantly ſupply'd by the Honourable and truly Good Lady, Madam *Gifford*, of *Chillington*, he living but about a Mile from her. I order'd him now and then a Balſamick Clyſter; but (to the beſt of my Remembrance) it was about twenty Days from the Time I firſt came to him, before he had any Stool that Way, but daily one or more thro' the Wound; which being conſtantly impregnated or mix'd with Balſam, it grew daily leſs and leſs, and was firmly heal'd and cicatriz'd without any other Application. I then put him on a ſoft Bolſter Truſs, which he wore a while, and never had the leaſt Appearance of a Rupture afterward.

Though the Inciſion made by Mr. *S.* put the Patient's Life in very great Danger, and though ſuch Practice is not warranted by any Authority that I know of; yet in ſuch deſperate Caſes, where there is (as above) a compleat Rupture of the *Peritonæum*, with an Extravaſation of Blood in the *Scrotum*, and the Excrements in no Poſſibility of being diſcharg'd by Stool, I think, ſuch a dangerous Method ought rather to be made uſe of, than to leave the poor Creature altogether deſtitute of the leaſt Hopes of a Recovery. If we conſider the thick and carnous Subſtance of the larger Inteſtines, (which in ſuch Ruptures muſt firſt make their Deſcent into the *Scrotum*) and how they are ſufficiently ſtor'd with Blood and Juices for Incarnation, I cannot perceive what Reaſon there is to be ſo apprehenſive of ſuch very great Danger. This is not the only ſingular Caſe of this Kind that I have known or heard of. Not many Years ago a Man in *Wolverhampton* had ſuch a Rupture, and the like Inciſion made, a great deal of extravaſated Blood diſcharg'd, with hard Excrements, and a large Piece of Gut, ſix Inches in Length, came away from him. I was not concern'd with this Perſon, but am very well aſſur'd of the Truth of it by Dr. *Congreive*, a Man of great Learning and Experience, who aſſiſted all along in his Cure. This Part of the Gut was waſh'd, and expos'd to the View of great Numbers of People who came to ſee him. He had for a great while no Stools but what came thro' the Wound, yet did perfectly recover, and liv'd in a good State of Health (free from any Thing like a Rupture) ſeveral Years after.

Of the Cure of the Cholera Morbus, Diarrhœa, Dyſentery, *and* Teneſmus. *Taken from Mr.* St. Hilaire's *Remedies of the Diſeaſes of Humane Bodies, the Pathology of* John Baptiſt Verduc, *Doctor of Phyſick, and others.*

THE Cure of the *Cholera Morbus* conſiſts in allaying the too violent Effervescence or Fermentation of the Maſs of Blood, in tempering the acrid Juices by gentle Purges and Diaphoreticks, and in ſtrengthening the Stomach by proper and mild Reſtringents, as follows, or the like: Take, Mint Water, Cinnamon, and Black Cherry, of each one Ounce; Spirit of Treacle, a Dram and a half; *Mynſicht*'s Elixir of Vitriol, twenty Drops; liquid *Laudanum*, a Scruple; ſix Drams of Syrup of Coral; mix for a Potion to allay the Diſorder of the fermenting Humours.

The Bezoardick Opiate of *Timæus*, which follows, is excellent in this Caſe: Take, *Venice* Treacle, two Ounces; Confect of Hyacinth, half an Ounce; Bezoar, two Drams; Magiſtery, of Pearl and Coral, a Dram of each; ſeal'd Earth, three Ounces; Tormentil and *Contrayerva*, of each one Ounce; Syrup of *Scordium*, enough to make an Electuary. In a *Cholera* proceeding from corroſive Poiſons, as Arſenick, Sublimate, Mercury, *&c.* warm Milk, ſweet Oil, and ſeal'd Earth, are uſeful to temper and qualify the great Acidity. When this ariſes from the vicious Aliment in the Stomach, Vomiting with *Vinum Scilliticum*, or the Vinegar or Syrup of Squill, with a little *Laudanum*, is uſeful. The Deterſives that work gently downward, are Whey depurated with Syrup of Roſes and Mallows, or Tamarinds. If Convulſions ſeize the Patient, the Carminative Decoction with *Bay* and *Juniper Berries* is to be applied by way of Clyſter, with Malmſey Wine, Oil of Amber, and Spirit of Salt; and if Poiſon be in the Caſe, Clyſters of Milk, with Herb, Mercury, Mallows, *Althæa*, Camomil, and Vervain, is to be exhibited, and all ſuch Things as have Power to curb or abſorb the corroſive Salts.

After Univerſals are premiſed, give Oil of ſweet Almonds, or Linſeed Oil cold drawn, to ſweeten the Acrimony of the Humours; or Mucilage of Quince Seeds, and Emulſions of the cold Seeds, with Cinnamon Water, Oil of Nutmegs, Cinnamon, liquid *Laudanum*, and the like, proportion'd to the Condition and Conſtitution of the Patient. Outwardly apply a Plaiſter to the Stomach, made of Gum *Ladanum* and *Tacamahaca*, malax'd with Oils of Maſtich, Mint, and Balſam of *Peru*.

In the *Cholera Sicca*, Take, the Carminative Decoction, four Ounces; to which add Oil of Bay Berries and Juniper, of each half an Ounce; adminiſter it Clyſterwiſe. Externally may be us'd Oil of Camomil, Mint, Maſtich, and Cinnamon, to anoint the Belly about the Region of the Navel.

Of the Cure of the Diarrhœa, *&c.*

THE Cure of this Diſeaſe and the *Dyſentery*, as well as the former, conſiſts in allaying the Heat and Ferment in the Blood and Humours, and eaſing the Pain, and quieting the Agitation of the Spirits, deterging and healing the Inteſtines, and making proper Evacuations of the Superfluities contain'd therein. If the *Diarrhœa* proceeds from too much Bile, or the ill Temperament of that Fluid, ſuch Medicines as *Glauber*'s Salt,

Salt, Cryſtals of Tartar, Tartar vitriolated, *&c.* prevail before any other; ſo Tincture of Steel, *Laudanum Cydoniatum*, and a Decoction of Tormentil, Biſtort, *Contrayerva*, Horſe-tail, and ſuch like, prevail. If from too great Purging a *Diarrhœa* is produced, make uſe of Bezoardicks, Treacle Water, *Laudanum Opiatum*; or Aſtringents, as *Crocus Martis*, ſeal'd Earth, and burnt Hartshorn. But if the Diſeaſe yields not to this, the moſt proper Courſe is to adminiſter a Dram, or a Dram and a half, of Rhubarb, infus'd all Night in Cinnamon Water, made with Barley, three Ounces; to which add Spirit of Mint, two Scruples; Syrup of Quinces, one Ounce. After which give the following Apozem:

Take, of clean Pearl Barley, two Handfuls; Shavings of Hartshorn, a Hart's Pizzle, of each half an Ounce; Tormentil and Sorrel Roots, of each three Drams; dry'd Myrtle Berries, two Drams; *Acacia*, half an Ounce; boil all in Spring Water and *Rheniſh* Wine, of each a Quart; ſweeten with Syrup of Coral, and add a few Drops of Spirit of Vitriol; take a ſmall Draught of this after the following Bolus: Take, ſeal'd Earth, burnt Ivory, of each eight Grains; Bezoar, and Pearl prepared, of each four Grains; Oil of Cinnamon, two Drops; Spirit of Mint, *qſ.* make it into a Bolus. Or Take of the following Electuary: Conſerve of Red Roſes vitriolated, two Drams; *Spodium* of Ivory, two Scruples; *Crocus Martis* aſtringent, three Scruples; Syrup of Pomegranate, *qſ.* Or apply a Plaiſter of Cruſt of Bread, ſoftned with Oil of Maſtick, to the Stomach. Or elſe, Take the ſharpeſt Leven, one Ounce and a half; Powder of Mint and Wormwood, of each two Scruples; Nutmegs and Red Roſes, of each a Dram; *Pomegranates* and *Balauſtians*, of each a Scruple; made into a Cataplaſm with Vinegar of Roſes.

Of the Dyſentery.

THE *Dyſentery* is to be treated in the ſame Manner as the *Diarrhœa*, and the Cure conſiſts in proper Revulſions, and abating the Acrimony of the Humours. Purging is proper in the Beginning of the Diſtemper; but beware of *Diagridium* and *Scammony*. In an Epidemical or Malignant *Dyſentery*, make uſe of Jelly of Hartshorn and Ivory, ſeal'd Earth, Tincture of Steel, the Hartshorn Drink call'd the White Decoction, the Liver and Fleſh of the Viper, the Pizzle of a Stag or Bull, *&c.* Where there is no Contagion, the *Ipecacuanna* Root has been found to be a Specifick. The Doſe is from a Scruple to two in a ſtrong Conſtitution, this making a gentle, but effectual, Revulſion, and confirming the Tone of the Stomach, and Inteſtines after; beſides which, Rhubarb, Tormentil, Biſtort, Comfry Root, *&c.* are very efficacious.

In the Beginning of the Diſeaſe, exhibit theſe or the like Forms: Take, Rhubarb, one Dram; infuſe it all Night in Cinnamon Water, with a Scruple of Snake Root, and two of Tormentil; ſtrain the Infuſion, and add to it an Ounce of Syrup of Succory, with Rhubarb, for a Potion.

Or if you would give the ſame in Form of a Bole, Take, *Rhubarb* in Powder, two Scruples, or a Dram; Conſerve or Syrup of Roſes, as much as ſuffices; Oil of Cinnamon, a Drop or two; or Oil of Nutmegs, five or ſix; mix, and give in the Morning. Or this Balſamick Bolus is very good where the Guts are excoriated, as is common in the Bloody Flux: Take, Conſerve of Red Roſes, *Lucatellus* Balſam, of each half a Dram; ſeal'd Earth, or Dragon's Blood, ten Grains; Balſam of *Peru*, four Drops.

In order to cleanſe and heal the Ulcers and Excoriations of the Guts, and cloſe the Mouths of the Veſſels that are too open, make uſe of the following Traumatick or Wound Decoction: Take, of Bur-dock Root, three Ounces; Madder, ſix Drams; Rhubarb, two Drams; Dictamny of *Crete*, St. *John*'s Wort, Sanicle, Bugle, of each a Handful; boil them in a Quart of Water, to which add a Pint of White Wine; then give one Boil more, and ſtrain. To the ſtrain'd Liquor, put two Drams of *Venice* Treacle; Honey, three Ounces; ſimple Oxymel, one Ounce; give the Patient ſix Ounces twice a Day.

Where the Pain is great, and the Gripings very ſevere at the coming away of Blood by Stool, apply this anodine Clyſter: Take, Marſh-mallow Roots, one Ounce; Linſeed and Fenugreek, of each half an Ounce; Ca-

momil Flowers, two Handfuls; boil them in a Pint of common Water; then add the Chymical Oil of Cummin Seed, Aniſeed, Bay Berries, or St. *John*'s Wort, two Drams: And if the Pains be very grievous, add a Dram of Oil of Turpentine, and ten Grains of *London Laudanum*, or *Opium*. Or this Balſamick Clyſter may ſometimes be more proper: Take, the Broth of a Sheep's Head and Appurtenance, ten Ounces; the Yolks of two Eggs; *Lucatellus* Balſam, one Ounce; Deer, Goat or Sheep's Suet, two Ounces. Or you may exhibit an Ounce of *Diaſcordium* diſſolv'd in Treacle Water; ſo Plantane, Horſe-tail, Golden Rod, Yarrow, Tormentil, Biſtort, Comfry, Pellitory, and Vervain, are of Uſe either in Clyſters, or to make vulnerary Drinks of.

The following Opiate is excellent in this Caſe: Take, of *Crocus Martis* aſtringent, prepared with Sulphur, two Ounces; choice *Sena* and Rhubarb in Powder, of each half an Ounce; Calomel, two Drams; Saffron, one Dram; Dragon's Blood, two Drams; Turpentine, as much as will make it up into a Maſs. Let the Patient take two Drams of this Morning and Evening, to promote Evacuation, and heal the Parts: Likewiſe a warm Pultiſe applied upon the Belly, made of Onions and *Coloquintida* Apples, boil'd in common Oil, will promote a kindly Evacuation, and eaſe the griping Pains. This is often very ſucceſsful againſt Worms in Children that nauſeate Phyſick. All the Earths, as Bole, and the like; the freſh Oils, as Linſeed Oil cold drawn, and the teſtaceous Powders, as Crabs Claws, *&c.* with burnt Hartshorn and Ivory, or the Raſpings and Jelly of the ſame, are uſeful in this Diſeaſe: But the Medicines chiefly to be depended on, are the *Ipecacuanna* Root, and the proper Aſtringents, with Rhubarb, though the following Draught and Bole, upon great Weakneſs and Fainting through the Loſs of Blood and Spirits, is extraordinary: Take, Juice of Kermes, two Drams; Coral prepared, one Scruple; ſeal'd Earth, half a Scruple; Japan Earth, two Grains; Oil of Cinnamon, two Drops; *London Laudanum*, one Grain; mix for a Bolus. After which, drink this *Hauſtus:* Take, Black-Cherry Water, one Ounce; Mint, half an Ounce; ſtrong Cinnamon Water, one Ounce; Juice of Kermes, ſix Drams; *Diaſcordium*, a Scruple; make a Draught.

To cure the conſtant Irritation or Motion to Stool, call'd the *Teneſmus*; Take, Flowers of Vervain, Melilot, and Camomil, of each a Handful; Linſeed and Fenugreek, of each one Ounce; cut them, and ſtamp them; then put them in a Bag, which boil in the Water where Smiths cool their Iron, and apply it to the Fundament. Or Take, Oak Leaves, two Handfuls; Flowers of Vervain, Camomil, and Roſes, of each one Handful; boil, and apply them as the former. Clyſters of Mutton Broth and Flowers of Vervain, *&c.* are good: But the moſt uſeful is a Fumigation, of White Poppy Heads, half an Ounce; Vervain, half a Handful; Red Roſe Flowers, Balauſtians, and Frankincenſe, half a Dram; Maſtick, a Dram; let the Patient ſit over the hot Fume of this.

Of Worms. *From* Nicholas Andry, *Doctor of Phyſick, of the Faculty of* Paris, *&c.*

AS Worms have been found to breed in Humane Bodies, as well without the Inteſtines as within, we ſhall firſt of all obſerve what Medicines are proper for thoſe bred out of the Guts, and in the next Place thoſe that lie in the Guts. In the firſt Place, the Worms that breed out of the Guts, are ſuch as thoſe that are diſcover'd in the Brain, call'd *Encephales*; Secondly, Thoſe in the Noſe, the Ears, the Teeth, the Lungs, the Liver, the Heart, the Blood, the Bladder,

the Sperm, the Skin, the Navel, and in Venereal Caſes. The *Encephales*, which breed in the Brain, ſometimes upon the *Meninges*, and ſometimes under the *Pia Mater*, are Worms very difficult to deliver the Patient of, becauſe they can neither be diſcharg'd by the Noſe, nor any other Way; and if they happen to die in the Head, they never fail to cauſe a Corruption capable of deſtroying the Sick: But one of the beſt Remedies againſt the Worms, is *Malmſey Wine*, in which Radiſhes has been boil'd, and whereof the Patient is to drink a ſufficient Quantity faſting.

The *Rinaires*, which *Borellus* calls *Naſicoles*, are thoſe Worms that breed at the Root of the Noſe, which are eaſily cured by *Errhines*. The Juice of Betony Leaves taken up the Noſe, is a very good Remedy, or the Powder of the ſame ſnuffed up. When there are Worms in the Ears, there is nothing better to drive them away, and kill them, than Juice of Onions, or ſome Drops of old Urine mix'd with Honey; or, after *Dioſcorides*, *Galen*, and *Aetius*, a little Juice of Catmint. I have (ſays Mr. *Andry*) uſed this laſt with Succeſs upon ſeveral Occaſions. The beſt Remedy to cure Worms in the Teeth, is to keep them clean, by waſhing every Morning, and after eating, to ſcale the Teeth with an Inſtrument, or rub them very well with a little Spirit of Salt in Water. The Root of Plantane chew'd is reckon'd a good Remedy. Worms that breed in the Lungs, and which cauſe the moſt violent Coughs, are very difficult to remove. There is a Medicine nevertheleſs which ſeveral Phyſicians have us'd ſucceſsfully, which is, Horehound mix'd with a little Honey, and made up with Oxymel of Squills into a *Lohoch*. There is not a better Medicine in Worms of the Liver, than to take Ten or a Dozen Wood-Lice in a Draught of Wine faſting. In Worms of the Heart, drink the Juice of Radiſh or Water Creſſes: Or Take, Gentian and Piony Root, of each two Drams; Myrrh, a Dram; mix all in fine Powder, and put it in Wine, whereof drink a Spoonful, ſnuff ſome up the Noſe, and rub the Lips and Temples of the Patient with it. This is likewiſe profitable in the Plague. There is nothing better for Worms in the Blood, than the Juice of *Chervil*, taking five or ſix Spoonfuls three times a Day for a Week together. The vegetable Salt is good againſt Worms that are in the Kidneys and Bladder, where but half a Dram is to be taken in the Morning.

The Cutaneous Worms, or ſuch as are in the Skin, are call'd the Hair Worms, the Hand Worms, the Silk Worms, *&c.* There is no better Remedy againſt the firſt Sort, than to waſh the Diſeas'd with warm Water, to rub the Part before the Fire with Honey, and then to put on courſe Linen. To bring theſe Hair Worms out, waſh the Puſtules with a Water made of an Ox's Gall; or the following Water: Take, ſix Drams of Water of *St. John's Wort*, half a Dram of Honey, and a Dram of Pepper; mix them together. It is proper ſometimes for the Relieving of theſe external Vices or Defections, to give ſuch Internals as may correct the Acidity, and alter the viſcous Quality of the Blood, and other Fluids, which yield a proper Food for the Nutrition of theſe Inſects. Theſe Remedies conſiſt of Wine, with a little ſoluble Tartar, and Oxymel of Squills, to take now and then in a Glaſs of *Spaniſh* Wine, Methegelin, *&c.* Otherwiſe this Compoſition is excellent: A Dram of Extract of Wormwood, the ſame of Crabs Eyes, with a few Drops of Oil of Saſſafras, taken in a Spoonful of *Elixir Vitæ*. In all Caſes where Worms abound, eſpecially in the Venereal, Calomel, or the beſt prepared *Mercurius Dulcis*, prevails.

Medicines againſt Worms in the Guts. From the ſame Author.

I Shall not here inſiſt upon Particulars, but preſcribe for Worms of all Sorts in General, whether long, round, flat, the *Aſcarides*, or others. There are Medicines which kill Worms without bringing them away, and others that kill them and diſcharge them out of the Body at the ſame Time. The firſt Sort are given inwardly, and the others outwardly. Thoſe taken internally, are ſuch as White Wine, Stale Beer, Verjuice, Purſlane, Lemons, Orange Peel, Garlick, Onions, Gentian, Worm-ſeed, or the two laſt boil'd in Water, with Shavings of Hartshorn and

Ivory, burnt Hartshorn, *&c.* ſo Muſtard, Oil, Tanſie Seed, and Bole Armon. in a little Syrup of Succory, with Rhubarb, is a very good Remedy. Or rather this: Take, *Carduus* Seed, Citron and Purſlane Seed, with prepared Coriander, of each a Dram; Powder of Diamargarite, half a Dram; raſp'd Hartshorn and Ivory, of each half a Scruple; Sugar of Roſes, one Ounce. If there is a Scouring of the Belly that is proper to abate, add Coral and Powder of Roſes, of each half a Dram; ſo make it up into an Opiate. The Juice of Plantane, old Treacle, bitter Almonds, and Pomegranate Juice, mix'd with Oil Olive, is good. Sweet Spirit of Nitre, Salt, or Sulphur, ſingly given in common Water to ſix or eight Drops, has good Succeſs; ſo Oil of Juniper, five or ſix Drops in a Glaſs of Wine. When Infants have a Fever attending the Worms, as is very common, give this Julep: Take, Purſlane and Succory Water, of each two Ounces; Confect of Hyacinth, a Scruple; Coraline Powder, as much; Coral prepared, half a Scruple; Syrup of Lemons, half an Ounce; mix for a Julep. When the Fever is malignant, give the following: Take, Scabious and *Scorzonera* Water, of each two Ounces; Syrup of Lemons, ſix Drams; Powder of Vipers, half a Scruple; and as much Coraline Powder; *Sal Prunella*, half a Dram; Confect of Hyacinth, a Scruple; mix all for a Julep. If with the Worms and the Fever there be Convulſions and Vomiting, then adminiſter the following: Take, Purſlane Water, two Ounces; Treacle Water, half an Ounce; one Scruple of Confect of Hyacinth, and as much Coraline Powder; mix all together for a Draught. The Coraline Powder is ſo ſerviceable againſt Worms, that ſometimes a Dram of it taken in Wine, will alone kill them, and bring them away. The Vertue of this Plant was unknown to *Dioſcorides*, *Galen*, and all the Ancients; but the Moderns are aſſured of its ſurprizing Effects from many repeated Trials. For my own Part (ſays the Author) I have ſucceeded with this ſingly ſeveral times, and have ſeen ſo much of it with my own Eyes, that I am not at all amaz'd at what has been related by ſo many Authors concerning the Vertue of the Coraline.

Oil is an excellent Medicine againſt Worms, taking ſome Spoonfuls of it in a Morning faſting. It muſt be faſting, becauſe then the Stomach and Guts are empty, and the Oil more eaſily affects the Worms. We may underſtand the Power of this Remedy upon all Kind of Inſects, as Earth Worms, Silk Worms, *&c.* by anointing their Bodies with Oil, upon which they quickly loſe all Motion. The Reaſon of this is, that the Worm dies as ſoon as it can breath no longer, and the Reſpiration of this Inſect depends upon little Holes or Pores rang'd along the Body, which when clos'd by any unctuous Matter, ſtop the Commerce of Air, and they inſtantly expire. *Malpighius*, who made all Sorts of Trials, ſays, that Butter will do the ſame Thing, if taken in a Morning faſting.

External or Topical Medicines, are Beaſts Gall; Oil of Wormwood, Rue, or bitter Almonds, mix'd with ſome Powders of Cummin, Aloes, and Centaury, and ſo applied like a Pultiſe or Plaiſter upon the Navel. Thoſe that both kill and expel the Worms, are Aloes, *Hiera Picra*, Powder of Orange Peel, Rhubarb, *&c.* being taken in White Wine ſingly, or compounded together into Electuaries or Pills, with a little Agarick, and Syrup of Wormwood. For ſmall Infants, give an Infuſion of Rhubarb, with a little Cinnamon, in any proper Water, and to the ſtrain'd Liquor add an Ounce of Syrup of Succory. This may be given with the Breaſt Milk, or other Food.

In the Jaundice the Guts are often full of Worms, becauſe the Gall, which is an Enemy to theſe Creatures, is not diſcharg'd into the Bowels; the beſt Remedy therefore in this Caſe is to take every Morning a Glaſs of the following Decoction: Take, Celandine, a Handful; Leaves and Flowers of *St. John's Wort*, the ſame; Shavings of Ivory, Gooſe Dung, of each three Drams; Saffron, half a Dram; the two laſt tied in Rags; put them into a Pipkin, with a Pint of White Wine, and a Pint of Wormwood Water; boil them a while, and then ſtrain the Liquor off, which drink the three or four next ſucceeding Mornings. The Gall that is diſcharg'd into the *Duodenum*, is that which hinders the Worms from coming into the Stomach; but in the Jaundice, as this Gall

is

is retain'd in the Liver, they more eaſily aſcend into the Stomach.

When the *Pleuriſy* is occaſion'd by Worms, which often happens, as we have obſerv'd, we ought to follow the Practice taught us by *Rulandus*, and which *Quercetan* recommends ſo much, that is, to begin firſt of all with Purging, which was chiefly founded on *Hippocrates*'s Aphoriſm, That when it is neceſſary to purge in a Diſeaſe, it is ſo at the Beginning. We have not fail'd to follow this Method with good Succeſs, and Experience has confirm'd it to us ſo often, that I ought not to adviſe any other. The frequent Bleeding on ſuch Occaſions is very dangerous, though it may not be ſo in other *Pleuriſies*.

The *Aſcarides* are Worms very difficult to be expelled, and that for many Reaſons: The firſt is, becauſe they are a great Diſtance from the Stomach, ſo that the Medicines loſe their Force much before they reach them. The ſecond is, that theſe Worms are wrap'd up in the viſcous Humours, ſo as to hinder the Operation of the Medicines. The third is, by reaſon of their getting into the Blind Gut, whereby they are as it were intrench'd from Danger. The Decoctions of Gentian are extraordinary againſt theſe Worms, eſpecially if join'd with Bithwort, Succory, Tanſie, and Savine; together with a little *Species* of *Hiera Picra*. *Hippocrates* adviſes *Agnus Caſtus Seed* well pounded, with a little Ox's Gall, and a few Drops of Oil of Cedar; make a Suppoſitory of this with Fat or oily Wool.

The Medicines which we have hitherto ſet down, are all uſeleſs againſt the *Solium* or Solitary Worm. The other Worms will ſometimes yield to the ſame Medicines, but the Solitary are never mov'd by any but one Sort of Medicine. *Avicen* ſays, that this reſiſts Wormwood, and that it cannot be brought away with *Fern* Oil, which ſo eaſily kills other Worms, but does nothing at all with this. The Remedy which reliev'd Mr. *Andry*'s Patient from the great Solitary Worm of four Ells and three Inches long, as expreſs'd in the Figure in his Book of the Generation of Worms in Humane Bodies, is as follows: Take, *Diagridium*, Cream of Tartar, Antimony Diaphoretick, of each half a Scruple; Rhubarb, and the Root of the Female Fern freſh powder'd, of each half a Dram; mix 'em, and let the Patient take 'em in fat Broth at his uſual Hour of riſing in the Morning. This Doſe may be increas'd or leſſen'd according to the Age, Strength and Conſtitution of the Party. There is another Way of giving this *Fern Root*, ſtamp'd with Honey, whereof two Drams is a Doſe; but it is better to give three Drams of it in a Glaſs of White Wine. You may give half a Dram to a Child at the Breaſt in a little of the Mother's Milk.

This *Fern Root* is one of the propereſt Things in the World againſt flat Worms, and has the Advantage over all others, in that it is agreeable to all Sorts of People; to thoſe that are in Fevers, as well as thoſe who have none; to Women with Child, and ſuch as are not; to Infants, and both old and young People. It allays all the Symptoms in the Sick, and procures perfect Eaſe, ſo that it may be given like Nurſe's Milk. Some Authors have writ, that it is dangerous to Women with Child; but that is falſe, as appears from *Spigelius* in his Treatiſe *de Lumbrico lato* or the flat Worm.

I ſhall give you an *Opiate* which I us'd (ſays the Author) on ſeveral Occaſions with great Succeſs, which conſiſted chiefly of the *Fern Root*, and the Bark of the Mulberry Root, to which we principally aſſign'd all the Vertue that was againſt the flat Worms: Take, *Coraline*, Vervain, *Scordium*, *Origanum*, of each half a Handful; Roots of white Dittanny, Fern, *Angelica*, and Gentian, of each two Drams; the Bark of the Mulberry Tree Root, a Dram and a half; Muſtard Seed, Purſlane, and Creſſes, of each a Dram; Pepper, half a Dram; Saffron, half a Scruple; reduce all into Powder, and with Honey deſpumated make it into an Electuary, to which add ten Drops of Oil of Vitriol. The Doſe is from half a Dram to one Dram and a half, taken in the Morning faſting. Theſe are not all the Medicines that may be us'd againſt the *Solium*, but ſuch as I moſt approve of, and have practis'd upon with Succeſs.

Of

Of the Cure of the Iliack Paſſion. *From* Michaelis Riverius, Sydenham, *and other Practical Phyſicians.*

DR. *Sydenham*, in his Method of curing Fevers, propoſes an odd and ſingular Method of curing the *Iliack Paſſion.* Firſt of all he gives a Scruple of Salt of Wormwood, to be taken Night and Morning in a Spoonful of Lemon Juice; and in the intermediate Time he preſcribes the Uſe of diſtilled Mint Water, without Sugar, or any other Addition: And while theſe Things are doing, he orders a live Cat to be applied to the naked Stomach, and after the Pain, with the Vomiting, is ceas'd for a Day or two, then the *Pil. Cochiæ major*, diſſolv'd in Mint Water, is exhibited, and the Mint Water is continued as long as any Vomiting remains; neither is the Cat remov'd, till the Patient is fit to take the Pills. In the mean time a light Diet is preſcrib'd, *&c.*

In this Diſaffection, *Mercurius Vivus* or Quickſilver was the firſt Thing that made its Way, as you will find in *Riverius*; ſo likewiſe the Perpetual Pill, made of *Regulus* of Antimony, has been us'd with good Succeſs; but the Gold Bullets are much more ſecure and efficacious than either, when the Caſe is ſo ſtubborn as not to yield to the following, or other the like Clyſters: Take, Flowers of Mallows, Pellitory of the Wall, and Camomil, of each a Handful; Roots of *Althæa*, one Ounce; *Coloquintida*, two Scruples; boil in common Water, and to ſix Ounces of the ſtrain'd Liquor add Oil of *Colocynthis*, half an Ounce; Linſeed Oil, two Ounces. *Rulandus* fomented the Navel with this, and afterwards injected the Remainder by a Syringe in the *Iliack Paſſion*, and gave preſent Relief. The moſt exquiſite and inſupportable Pains, where the Patient has been brought to the Extremity of knocking his own Brains out, has been inſtantly reliev'd by Clyſters of ſweet Spirit of Nitre, Salt, or *Hungary* Water, either with Oil of Amber, or Turpentine. The oily Clyſter in this Caſe is excellent: Take, Oil of Linſeed, three Ounces; Camomil and Aniſeed, of each two; Scorpions and Rue, of each one Ounce; Oil of Turpentine, a Scruple: So likewiſe the *Crocus Metallorum* is us'd by way of Clyſter in Sack, or *Hungary* Water, with very good Succeſs. Mice and Rats Dung make uſeful Suppoſitories, with Honey, and Oil of *Colocynthis*. In all Hardneſs of Excrement, the Fat on the Entrails of a Calf is very ſerviceable.

Of the Cure of the Colick. *From* Michaelis Riverius, Sydenham, St. Hilaire, *and others.*

IN the Cure of the Colick, we ought to obſerve Three Things: Firſt of all, That the Belly be open, and the Pain calm'd by Anodines: Secondly, That if the Colick be caus'd by the Matter contain'd in the Guts, the viſcous Subject be evacuated, and the Wind diſſipated: Thirdly, That in the Convulſive Colick, proper Neu-

Neuroticks be applied, as the volatile Salts, with *Opium*, *&c.* Purging is convenient in the Beginning of the Colick, to relax the Belly when too hard and bound up, eſpecially if mix'd with Narcoticks. Clyſters are more uſeful, and more ſafe, particularly when the Pain affects the great Guts. Bags, Plaiſters, Ointments, and Fomentations, ſometimes anſwer, when Internals loſe their Force, eſpecially ſuch as conſiſt of ſubtle, ſpirituous and oily Parts; as the Chymical Oils of Cummin, Juniper, Roſemary, with the volatile Spirits, *&c.* *Rodericus a Fonſeca*, in his *Conſilia*, propoſes the Teſticles of a Horſe as the beſt Remedy in the Colick which he had met withal in his whole Practice.

The Vinous Clyſters are commonly the firſt Things directed in the Beginning of Colick Pains, as Sack, and Oil of Aniſeed, or ſome other ſtrong *Spaniſh* Wines, and ſome of the Chymical Oils; otherwiſe to exhibit large Quantities of the volatile Spirit of *Sal* Armoniack, with Amber, the *Sal volatile oleoſum*, with ſome Drops of liquid *Laudanum*, ſweet Spirit of Salt and Nitre, with Tincture of Amber, *Caſtor*, Salt of Tartar, *&c.* Clyſters of the Seeds, Berries, and their Chymical Oils, are uſually adminiſtred through the whole Courſe of this Diſeaſe, and ſometimes with little or no Effect.

When the Colick proceeds entirely from Wind, uſe the following Clyſter: Take, Roots of *Angelica*, ſix Drams; Flowers of Camomil and Roſemary, of each a Handful and a half; Laurel Leaves, half a Handful; of the four hot Seeds, an Ounce; boil them all in a Quart of Water, to which add ſix Drams of Electuary, of Bay Berries, of the Oil of Cummin, Carui and Bay, of each ten Drops; Treacle of *Venice*, two Drams; the Yolk of an Egg; mix all for two Doſes. Or Take a ſufficient Quantity of freſh Urine, Aniſeed, Fennil, and Dill; boil all, and add a little Honey of Roſes to the ſtrain'd Liquor.

An internal Remedy for the Wind Colick: Take, Rue, a Handful; *Ameos*, Cummin, *Origanum*, black Cummin, Parſly Seed, bitter Almonds, black and long Pepper, *Daucus* Seed, Acorus, Bay Berries, and *Caſtor*, of each two Drams; *Sagapenum*, half an Ounce; *Opoponax*, three Drams; Honey, as much as will form it into an Electuary; whereof take the Size of a Nutmeg in a Glaſs of warm Wine.

Where the *Faces* are obſtructed, Take, the four Emollient Herbs, of each a Handful; Elder Flowers, half a Handful; Roots of Marſhmallows, one Ounce; boil in Water, whereof take eight Ounces, and add Lenitive Electuary, one Ounce and a half; *Sal* Gem, one Dram; the Yolk of an Egg. Where Flegm ariſes, Take, Calaminth, Rue, Mint, Centaury, of each a Handful; Roots of *Angelica*, *Enula Campana*, of each one Ounce; Maſterwort, half an Ounce; *Carthamum* Seeds, half an Ounce; boil theſe in Water, whereof take a Pint, and add *Hiera Picra*, one Ounce; and the Yolk of an Egg.

For an Anodine Clyſter, Take, Camomil and Vervain Flowers, of each a Handful; Roots of white Lillies and *Althea*, of each one Ounce; Linſeed and Fennil, of each two Drams; boil them in a Pint of Water to the Conſumption of half, then ſtrain, and add Camphire and *Opium*, of each twelve Grains; with the Yolk of an Egg. For a Plaiſter to the Region of the Navel, Take the Plaiſter of Bay Berries, two Parts; *Tacamahac*, one Part, malax'd with Oil of Camomil and Dill, of each ſix Drops. Or if you would apply a Bag to the Belly, Take, Camomil and Elder Flowers, of each a Handful; Tops of Dill, one and a half; common Salt, a Handful; Seeds of Carui, Cummin and Dill, of each three Drams; Bay Berries, one Ounce; make a Bag of them; and inwardly give in two Ounces of Bates his Camomil Water compound, half an Ounce of Syrup of Orange Peel, and thirty Drops of liquid *Laudanum*. If the Colick ſeems to ariſe from a cold Cauſe, Give, Pills of *Hiera*, with Agarick, one Scruple; Extract of Troches, Alhandal, four Grains; with Oil of Cinnamon, Cloves, Orange Peel, or Saſſafras, four Drops: Or otherwiſe, Give, the Rhubarb Pill, one Scruple; Scammony ſulphurated, ſix Grains; Oil of Cummin, three Drops; make into Pills.

For the Hyſterick Colick, Take, of *Caſtor*, half a Scruple; volatile Salt of Amber, five Grains; *Laudanum Londinenſe*, two Grains; mix theſe for a Doſe. Or Take, Flowers of Sulphur, Sugar, Aniſeed, Zedoary, of each eight

eight Grains; one Grain of *Laudanum*: Likewiſe a Dram of *Venice* Treacle and Mithridate, taken in a Glaſs of Wine, after the Belly is looſen'd, are powerful Remedies in the Colick, by reaſon of their Alexiterial and Anodine Properties, that make 'em univerſal.

To purge and bring away the foul viſcous and agglutinated Humours, Take, White Mechoacan Seeds of *Carthamum*, from half an Ounce to one Ounce; Turbith, Agarick, Roots of Jalap, of each half an Ounce; Juniper Berries, one Ounce; Orange Peel, half an Ounce; Zedoary, Galangale, of each three Drams; Ginger, a Dram and a half; Pepper, one Dram; infuſe 'em in *Rheniſh* Wine in a Bottle cloſe ſtop'd; after decant, and ſweeten with Sugar. The Doſe is three or four Spoonfuls faſting. This relieves extreme windy Colicks, as well as others, though it may be aſſiſted by taking with it a little of the following Powder: Take, Orange Peel, half an Ounce; Aniſeed, Fennil, Carui and Cummin, of each a Dram; *Species Diacum & Dianiſi*, of each two Drams; Mint, half an Ounce; mix into a Powder.

In the Retention of the *Faces*, *Allum* has been propos'd as a great Secret, applied in Form of a Clyſter, according to *Angelus Sala*: Likewiſe a Clyſter of *Crocus Metallorum*, and Oil of Olives, is prevalent; ſo is Spirit of Wine, in which Quickſilver has been a Month infus'd: But you ought to obſerve to filter the Decoction of *Crocus Metallorum*, otherwiſe it may be prejudical. Or for a Clyſter, Take, Oil of Linſeed and Rape, of each four Ounces; *Diacatholicon*, one Ounce. The following Lenitive Electuary is excellent: Take, Pulp of Raiſins, three Ounces; Powder of Jalap, a Dram; *Scammony Roſat.* two Scruples; white Cryſtals of Tartar, three Drams; with Syrup of Roſes; make an Electuary. In Obſtructions of Stool, Aloes, Rhubarb, and the like Things, do the leaſt Service; but large Luxative Draughts of *Sena* and Tamarinds, with Prunes, *&c.* are the moſt ſerviceable.

In the *Lientery* and *Cæliack Paſſion*, gentle Vomiting is more uſeful than the ſtrong, becauſe it does not affect the Ventricle with ſuch Violence. Externally *Crato*'s Stomatick Oil is advantageous; as likewiſe *Mynſicht*'s *Styptick* Balſam, the Plaiſter of *Tacamahaca*, Maſtick, *&c.* the Styptick Liquor of *Terra Sigillata*, Syrup of Coral, *Quercetan*'s Lienterick Decoction, Syrup of Maſtick and Nutmegs; ſo Cataplaſms of Vulneraries, and Anticolick Herbs, with Flowers of Roſes, Oil of Wormwood, Mint, *&c.* A Lientery that ſucceeds an Acute or Chronick Diſeaſe, is difficult to cure, becauſe of the Want of Strength, as *Sennertus* has obſerv'd. The *Cæliack Paſſion*, if it ariſes from the Obſtruction of the Meſentery, is cur'd by *Crocus Martis Aperiens*, Tincture of Steel tartariz'd, and ſuch Things as are proper to recover the loſt Tone of the Parts, as *Species Diatrion Santalon*, Hartſhorn, Ivory, *&c.*

In the Bloody Flux from the Liver, all Hepaticks are ſerviceable. Snails Fleſh is likewiſe of great Conſideration, with Tincture of Steel, Syrup of Coral, and the Liver of a Wolf prepared; ſo Ivory, Agrimony, Tincture of Sulphur vitriolated, Rhubarb, Diet Drinks of Agrimony, *&c.* Externally the Santaline Cerate, mix'd with *Crocus Martis Aſtringens*, and ſome appropriate Oils, are very uſeful; as likewiſe the following Preſcriptions: Take, Ivory uncalcin'd, two Drams; Viper's Liver prepared, one Dram and a half; *Species Diaſantalon*, one Dram; *Crocus Martis Aſtringens*, half a Dram; mix. Or Take, Tincture of Coral, and the Hepatick Eſſence, of each three Drams; or Succory Water, and that of Agrimony, of each three Ounces; Syrup of Coral, one Ounce and a half; Tincture of Coral, and *Crocus Martis Aſtringens*, of each a Dram and a half. Or this Electuary: Pulp of Raiſins, one Ounce; Ivory uncalcin'd, Wolves Liver prepared, of each three Drams; *Crocus Martis Aſtringens*, one; *Species Diatrion Santal.* half an Ounce; Syrup of Coral, enough to make an Electuary.

Of

Of the Diſeaſes of the Meſentery. *From Mr.* St. Hilaire, Michael, Barbette, *&c.*

THE *Meſentery*, from it ſelf, as well as from the great Number of Glands in it, is ſubject to Obſtructions, Inflammations, Tumours, Ulcers and Corruption. The Obſtruction in the Meſenterick Veſſels is a very common Diſeaſe, and the Riſe of many others; for as there are two Sorts of Veſſels, to wit, thoſe of the *Porta*, and the Lacteals, one or other of theſe are ſubject to this Inconvenience. The Obſtruction of the Lacteals is uſually occaſion'd by a thick and viſcous Chyle, ill digeſted, and not well volatiliz'd; and that of the others from the pituitous, acid and bilous Blood. One or the other may happen from the Compreſſion of the Glands of the *Meſentery*, or the Tumours of the Subſtance bordering on the Guts. We may know the Obſtruction of the Lacteals by the Loſs of the Chyle's Diſtribution, which is attended with a chylous and white Flux of the Belly, together with an *Atrophy* and Leanneſs of the Body, that comes without any other viſible Cauſe. If the Obſtruction is from the Veſſels of the *Vena Porta*, there are a great many Accidents follow; as, a Perception of Laſſitude, Stretching, wandring Pains and Noiſe, or Rumbling in the Belly, a Weight and Stupidity in the Head, and ſometimes a ſlow Fever. Theſe Diſorders, when inveterate, prove very ſtubborn, and yield not but with much Difficulty to Medicines. They are at the ſame Time very dangerous, becauſe they deprive the Body of a good Share of its Nutrition, if they do not take away the whole.

The Abſceſs of the *Meſentery*, its Tumours, and particularly the Inflammations, are likewiſe the common Source of ſecret and obſtinate Diſeaſes, that are difficult to find out, becauſe the *Meſentery* is ſituated deep, tied to ſeveral other Parts, and is of a ſlow blunt Senſation, that renders the Symptoms leſs apparent, and deceives ſometimes both Patient and Phyſician. There are beſides ſeveral little Glands, which being differently affected, produce different Symptoms in the Belly, and being interwoven with Abundance of Nerves, whereof the *Meſentery* is compos'd, that affect other Parts by Conſent, it is therefore hard to diſtinguiſh the Diſeaſes of that Part from ſeveral others. The Inflammations of the *Meſentery*, the Tumours, and the ſecret Abſceſſes, are very frequent. It is ſubject beſides to Scrophulous Tumours, or the Scirrhous in the Glands, as appears in Infants that are Conſumptive, where the Belly is ſwell'd as in a Tympany. The *Meſentery* is much more ſubject to Inflammations than the other Parts, becauſe of the vaſt Numbers of Blood Veſſels inſerted into it, and the prodigious Quantity of little Glands, which eaſily ſubject it to an Inflammation, eſpecially when any Diſorder of the Guts is join'd with it. The *Meſentery* is ſometimes inflam'd ſingly, ſometimes the Inteſtines are inflam'd with it, which is more advantageous to the Phyſician.

The Inflammation of the *Meſentery* is terminated by an Abſceſs, or a *Scirrhus*, which are very common both in the *Meſentery* and its Glands. The Suppurations in theſe Parts are very ſlow, and thoſe who have long labour'd under this Affliction, become either Phthiſical or Hectick. If this *Pus* is caſt off other Ways than into the Inteſtines, and where it cannot gain a free Courſe, it raiſes ſometimes a Diſeaſe like a Colick. If it is thrown into the Cavity of the *Abdomen*, it infects and gangrenes the neighbouring Parts, or elſe corrodes them by its Acrimony, and is the Source of a Thouſand Miſchiefs. Sometimes the *Pus* flows no other Way than by Siege, as is ordinary; or by Urine, which is more rare; then it corrodes the Guts, and communicates to them a *Gangrene*, or *Sphacelus*,

celus, according to the Obſervation of *Tulpius*.

To diſtinguiſh the purulent Excretion that comes from the *Meſentery*, from that which comes from the Exulceration of the Guts, we ought to obſerve, that if the purulent Matter flows ſuddenly, plentifully, without Pain, and mix'd with Blood, it is impoſſible but that it ſhould proceed from the *Meſentery*; but if the Flux be in leſs Quantity, ſlow, and with Gripes, by little and little, and ſucceſſively, it is from an Ulcer of the Inteſtines, as from Examples related by *Bartholin* and *Rhodius*. There is one Thing worthy Obſervation in the Suppurations of the Inflammations of the *Meſentery*, to wit, That they procure a plentiful Diſcharge of Urine, without any Relief to the Patient. Though there be a laudable Sediment of Urine, the Phyſician cannot conceive any great Hopes, becauſe there is no true Sediment, but a Kind of Fuſion of the Body, that happens in lying down.

In Obſtructions, and other Vices of the *Meſentery*, Clyſters are recommended as the neareſt Way to reach the Part; beſides which, Tincture of Tartar, the *Arcanum* of Tartar, Tartar Vitriolate, *Penotus* Aperitive Spirit, Spirit of Nitre, Chalibeate Wines, are preſcrib'd as good Alteratives; together with *Quercetan*'s Pill of Tartar, with Gum *Ammoniacum*, and the Catholick Extract. How far Vomits are adviſable in theſe Caſes, and what is more particularly directed, you will find by conſulting *Matth. Martinus* of the Diſeaſes of the *Meſentery*. If there be Occaſion for Diareticks, *Sennertus* Spirit of Tartar, Tartar Vitriolate, the *Sal Martis*, *&c.* will anſwer the End. When the Liver requires ſtrengthening, the *Crocus Martis* Saccharated is proper; as likewiſe the Cachectick Powder of *Quercetan*, the Steel Syrup of Bates, *Fonſeca*'s artificial *Acidulæ* of Iron, *Mynſicht*'s Tincture and Elixir, the *Vitriolum Martis* of *Zwelfer*, and ſeveral other Preparations to be made from Steel and Vitriol, are very uſeful in theſe Caſes, but require to be often chang'd.

In the Inflammation of the *Meſentery*, *Caſſia* is to be avoided, becauſe of its Flatulency; but *Manna* is very agreeable, eſpecially with other gentle Purgatives, which do beſt in Inflammations, as Tamarinds, *Senna*, the Laxative Syrup of Apples, *&c.* In the Abſceſs of the *Meſentery*, Deterging Medicines are profitable, according to the Obſervations of *Sebiziul*, as *Mynſicht*'s Chalybeate Wine, Extracts of *Mars*, Laxative Clarets, *&c.* from thence Conſolidating Medicines, as Turpentine Pills diſſolv'd in the Yolk of an Egg, Jelly, or Cock Broth. The Kernels of Apricock and Peach Stones are a great Secret in Hypochondriack Pains, Scurvy, and Diſorders of the *Meſentery*, eſpecially join'd with good Vulneraries, as Agrimony, Tamariſk, *St. John's Wort*, &c.

In Pains of the *Meſentery*, a red or deep colour'd Urine does not always proceed from a præternatural Heat, but ſometimes comes from the Saltneſs of the Humours, as a *Lixivium*; ſo a Lixivious Urine is render'd of this Colour, if detain'd or kept too long in the Bladder. In this Caſe, Preſcribe of the Emollient Herbs two Handfuls; boil in Goats Milk, whereof take a Pint, and add thereto Oil of Violets, and *St. John's Wort*, of each two Ounces; Electuary of *Hiera Picra*, one Ounce; or two Drams of the *Species*; Honey of Roſes, one Ounce; exhibit preſently, becauſe in theſe Diſaffections, where Wind prevails ſo much, the firſt Paſſages muſt be made clear; and then give the following: Take, Roots of *Scorzonera*, Graſs, the Aperitive Roots of each, three Drams; the *Cordia* Flowers, Succory, Daiſie, Broom and Liver-wort; cut, and ſtamp; then boil them in *Mutton* or *Cock Broth*: And where the Pain is very acute, uſe Oil of Camomil, and ſometimes that of Henbane by Expreſſion.

5

Of

Of the Diſeaſes of the Liver, *and their Cures. From* Mr. St. Hilaire, Michael, *&c.*

THE principal Diſeaſes which happen to the Liver, are, Intemperance, Obſtruction, Inflammation, Yellow Jaundice, *Scirrhus*, Wounds, Ulcers, Corruption of the Subſtance, Atrophy, Cachexy, and Dropſy. The Liver is capable of receiving all Sorts of Intemperances, ſimple or compound. When the Liver is too hot, there is a Loſs of Appetite, violent Thirſt, and a great Heat throughout the Body, eſpecially in the Palms of the Hands, and the Soles of the Feet. If the Intemperance be complicated, and the Humour hot from the Blood or Bile predominating, there is then Vomiting, or a Caſting up of Gall, a Bitterneſs in the Mouth, a Diſtaſt of Food, a burning Thirſt, and a ſlow gentle Fever. The Signs of the too great Coldneſs are the too common and plentifull Scourings of the Belly, that are very pale and fœtid, a great Deſire of Eating, without Thirſt or Fever. This Intemperance is more dangerous to the Liver than to the Stomach, becauſe the Fluids that produce it, are more oppoſite to the Functions of Nature.

Obſtructions are very common to the Liver, becauſe of the Minuteneſs of the Veſſels, that are eaſily clos'd by the groſs Impurities and Viſcidity of the Blood. Theſe Obſtructions are known by the Weight and Diſtention of the Right *Hypochondria*, and the obtuſe Pain felt there, eſpecially when they ſtir after eating; for the Tumour and the Fever are not diſcoverable in this Diſeaſe.

The Inflammation of the Liver ariſes from the ſame Cauſes with other Inflammations. The chief are Contuſions and Falls upon the Right Side. Plaiſters and Ointments too hot applied to the Liver, and the Sticking of Cupping-Glaſſes, may produce Inflammations, as *Hildanus* has obſerv'd. The Inflammation on the convex Side is much eaſier to know than that on the concave. In the firſt, the Symptoms are much more preſſing, and like thoſe of the *Pleuriſy*; in the laſt, the Symptoms have Relation to the Diſorders of the Stomach. If it be the concave Part that is inflam'd, the Patient feels a continual Hiccup, and ſometimes a bilious Vomiting upon it; but theſe Symptoms are ſo familiar to *Pleuriſies*, that we ought rightly to know the Difference betwixt them: Therefore the moſt particular Diſtinction is, That the Pain is very violent in the *Pleuriſy*, and little or none at all in the Inflammation of the Liver; That the Inſpiration is difficult, and the Expiration eaſie; inſtead of which, theſe two Actions are both labour'd in the *Pleuriſy*. Beſides, the Cough is violent, frequent and humid in the *Pleuriſy*, gentle and dry in the Inflammation of the Liver. The Pulſe in *Pleuretick* Perſons is hard and vibrating, but undulates in the Inflammation, where there is a certain Weight felt at the Bottom of the *Thorax* towards the Right Side; and when the Inflammation is on the convex Part, we may find it by the Reſiſtance in the Touching.

The Inflammation of the Muſcles of the *Abdomen* often deceive Phyſicians, and paſs for Inflammations of the Liver: But the Diſtinction is eaſy; for there is a Pulſation in that of the *Abdomen*, and none in the Liver. *Sennertus* prudently adviſes Phyſicians againſt being deceiv'd by the Figure of the Liver, in taking it, when ſwell'd, for a Tumour in the Middle of the Belly. The Inflammation of the Liver is very dangerous, and ſometimes mortal; That of the hollow Part is much more ſo, becauſe of the Symptoms of the Stomach, as Naufeating, Vomiting, and Diſtaſt. The Inflammation of the gibbous Part is more gentle.

The *Yellow Jaundice* is a Diſeaſe in which the Body is ting'd of a yellow, livid, black or greeniſh Colour, is occaſion'd by a vitiated Bile and *Pancreas*, and tinges and depraves the whole Maſs of Blood. The Diſorders the Bile or Gall are ſubject to, are, 1. When it is wanting in the Inteſtines; for then there is no Separation made, and the Chyle is not tinctur'd. This Fault is common, when the Gall is not filtred in the Liver, or when there is an Obſtruction in the *Ductus Choledochus*, that nothing flows therein. 2. When the Bile is dull, or loſes its Edge, that is to ſay, is not active enough, but vapid and ſpiritleſs, then it is ſubject to coagulate for want of its balſamick oily Parts, and communicate an ill Diſpoſition to the Chyle, and other Juices it meets with. In the next Place, the too great Thickneſs and Viſcidity of the Gall, is the Reaſon why it cannot yield a Tincture to the Chyle, becauſe its volatile eſſential Parts are impriſon'd and lock'd up in the Flegm and glutinous Subſtance of the Bile, ſo that the Chyle cannot be ſeparated or duly filtred in the Inteſtines; but it infects the Maſs of Blood, the Texture whereof is hereby mightily broken.

The Fault of the *Pancreatick* Juice, which is met withal ſometimes as well as that of the Gall, conſiſts in this, *viz.* That its Acidity is vitiated, and become either too aluminous, auſtere, or vitriolick, and for want of a due Effervеſcence, deſtroys the natural Separation of the fæculent Matter from the Chyle in the Guts, and ſo forms a deprav'd Juice, that communicates it ſelf to the whole Maſs of Blood; from whence it comes, that we may obſerve ſuch livid, Lead, and almoſt green, Colours, in thoſe that are afflicted with the *Jaundice*, which Diſeaſe, beſides the Yellowneſs of the Skin, Reſtleſneſs and Pain about the Heart, with Oppreſſion, Loſs of Appetite and Strength, is particularly diſcoverable by the Urine or *Serum* of the Blood, wherein if a Rag be dip'd, it will be colour'd as if dy'd with Saffron; as likewiſe with a Bitterneſs in the Throat.

The Signs of the Obſtruction of the Gall-Bladder, are white Stools, or an obſtinate Conſtipation of the Belly, which being once open'd, the other is reliev'd. A *Diarrhœa* ſometimes comes upon a Jaundice, join'd with a Fever, which is call'd a *Bilious Diarrhœa*. Sometimes the Jaundice is attended with a Fever, and ſometimes it is without: Sometimes it precedes the Jaundice, which is then Critical or Symptomatick; and ſometimes a ſlight Fever ſucceeds upon it, rais'd by the Fermentation of the Blood, that is increas'd by the Precipitation of the excrementitious Parts of the Maſs of Blood. When the *Jaundice* is ſtubborn, and returns again after it has been cured, it is uſually found that there are Stones in the Gall-Bladder.

The moſt ſafe Yellow Jaundice is that which is Critical in the Fever: After that the Jaundice that proceeds from the Obſtruction of the Gall-Bladder. The moſt dangerous, according to *Hippocrates*, is that which is Symptomatick in the Fever. The Stones in the Gall-Bladder are difficult of Cure; for they always bring the Jaundice on again, and at laſt occaſion Death. A Jaundice join'd with a *Scirrhus* of the *Liver*, or the *Spleen*, is ſometimes incurable, and is ſucceeded by a mortal Dropſy: One caus'd by Poiſon, is more or leſs dangerous according to the Nature of the Venom.

A *Scirrhus* is a hard Tumour, without Pain, to which the Liver is very ſubject, becauſe it is a glanduleus Part. The Liver becomes ſcirrhous, when the Blood and other Liquors grow thick in the Contexture of the Glands; the unequal Particles, and thoſe that more embarraſs the nutritious Juice, being of a Figure that hinders Circulation, and ſtopping in the Subſtance of that *Viſcera*, the Glands and the Pipes are clos'd up, and they filling ſtill more and more, the earthy and ſaline *Lympha* that ſtops in the Glands, hardens at laſt like *Plaiſter*, becauſe the more fluid Particles are evaporated, and ſo they form a Sort of petrify'd Subſtance, ſuch as we ſee every Day when the Liver, Spleen or Kidneys are ſcirrhous'd, which are known by feeling upon the Part, eſpecially the Liver, by its oppreſſive heavy Pain, a little dry Cough, with Leanneſs of the Body, and Paleneſs of the Complexion.

An Ulcer of the Liver is always preceded with an Inflammation of the Part, becauſe the Blood, ſtop'd there by the Obſtruction of the Glands, gains a Fermentation, breaks out of its Channels, and ulcerates the Subſtance

ſtance of the Liver; which is known by a burning Pain in the Right *Hypochondria*, as if beat upon the Part; or from Coughing, and a Difficulty in Breathing. The Face is yellow, and full of Puſtules. If the Ulcer poſſeſs the hollow Part of the Liver, the Evac iations are mix'd with *Pus*, and ſometimes Blood. They feel Pain in the Inteſtines, becauſe of the Irritation of the acrid Matter, which could not come there but by the Biliary Duct, that diſcharges it ſelf into the *Duodenum*. In the Progreſs of this Diſeaſe, there happens a ſlow Fever, which degenerates into a Hectick, with a Loſs of Appetite, an ill-ſavour'd Breath, and at laſt Faintings.

Sometimes the Liver changes its Subſtance, and is corrupted or rotten, which may be known by the ſlow Fever that ſeizes on the Patient, an extraordinary Diſtaſt of Food, eſpecially of Fleſh Meat, a *Syncope* and Fainting of the Spirits, becauſe of the unwholeſome Exhalations and fœtid Smells which ariſe from the Part affected, which is ſmall at the Beginning, then larger, and at laſt very great and dangerous, being follow'd by cold Sweats, that are very pernicious to the Sick.

If a Wound be receiv'd on the Right Side a little below the Navel, that it penetrate forward, and obliquely towards the Baſtard Ribs, ſo that black Blood flows from the Wound plentifully, and the wounded Perſon feels a great Pain in that Part, ſo that he vomits Bile, and reſts more commodiouſly lying upon his Belly, than in any other Situation; then we may ſafely pronounce the Liver wounded, which (if deep) is generally mortal, becauſe of the Multiplicity of Veſſels that are diſtributed in this *Viſcera*, and becauſe the Heart and Lungs ſuffer by the Communication of their Nerves, that occaſion Faintneſs, Bilious Vomitings, and Difficulty of Reſpiration.

The *Atrophy* or Waſting of the whole Body, is when it is not fed or nouriſh'd by the Food, which happens either thro' the Fault of the Aliment in the Maſs of Blood, or thro' the Inaptitude of the Aliment for Nutrition. The Fault of Nutrition happens, when there is no Chyle made in the Stomach, or when one eats Things that afford little Nouriſhment, or are bad: In the next Place, when the Chyle that is made, is not convey'd into the Blood through the Fault of the Lacteals, which are obſtructed in the Inteſtines. Thirdly, Nutrition may fail, when the Chyle mixes with the Blood, and is aſſimilated to it, yet is evacuated too plentifully by bleeding at the Noſe, and other Fluxes of Blood, from whence an *Atrophy* neceſſarily follows.

Exceſſive and continued Fears make Way for this Diſeaſe, in draining up the nutritious Juice. Heat produces the ſame Effects, in liquefying the nutritious Juice, and making too extraordinary a Conſumption. A Flux of the Belly, that is too copious, is of the ſame Kind; and *Borellus* takes Notice of an *Atrophy* that happen'd after a Medicine that occaſion'd a Superpurgation. The *Fluor Albus* in Women, which (if continual) is nothing elſe but a real *Gonorrhœa*, degenerates into an *Atrophy*. In ſhort, the too great Uſe of Venery, where the Evacuations are great, does the very ſame Thing.

The *Cachexy* is a Diſeaſe that makes the natural Colour and Livelineſs of the Body degenerate into a pale, livid, green or yellow Hue, and renders the Diſpoſition bloated, and full of dry Spots. The immediate Cauſe (ſays *Etmuller*) is the too great Crudity of the Maſs of Blood, or the Want of Fermentation, that hinders the Chyle from being aſſimilated and made one Maſs with the Blood; ſo that that Fluid is not chang'd, render'd more ſpirituous, or volatiliz'd by the Mixture, but being incapable of producing a good Fermentation, the Blood remains crude, viſcous, and gains an Acidity that ſtops the Briskneſs of its Motion, and hinders its Separations. But if the Diſeaſe increaſes more and more, ſo that the Habit of the Body is extremely puffed up and foggy by the Relaxation of the nervous and muſcular Fibres, it is then call'd *Leucophlegmatia*, which is the higheſt Degree of the *Cachexy*, and happens, when the Glands of the Muſculous Parts, as well as the Lymphatick Veſſels, are obſtructed by this crude Juice, ſo that the *Lympha*, or at leaſt the Serous Parts, cannot be return'd by the Lymphaticks; but that they remain in the Parts, which they ſwell or puff up more and more, till they produce the Diſeaſe nam'd the *Anaſarca*, which paſſes for a third Sort of Dropſy,

ſy, to wit, that of the whole Habit of the Body. Sometimes the *Leucophlegmatia* and the *Anaſarca* are confounded together; but theſe Diſaffections do not agree but in regard to the Subject, that is to ſay, the Habit of the Body; for the *Leucophlegmatia* comes from the *Pituita*, and the *Anaſarca* from an *Ichorous Seroſity* diſcharg'd in the very Habit of the Body, perhaps (as has been ſaid) through the Fault of the Lymphatick Veſſels.

The Dropſy is a Collection of Water or *Serum* contrary to Nature, that is neceſſarily attended with a Tumour, and the Diſtention of the Part, with Softneſs and Fluctuation. Theſe Waters ſwell all the Body, or only one determinate Part of the Body, which makes either an Univerſal or Particular *Dropſy*. The firſt is call'd *Anaſarca*, and the next takes different Names according to the Part affected. In the Head, it is call'd *Hydrocephale*; in the Breaſt, a Dropſy of the Breaſt; in the *Abdomen*, the *Aſcites*; and ſo on for the reſt. The *Tympany* is not properly a Dropſy, nor plac'd in the Number of them, but from its Reſemblance with the *Aſcites*. The Hydropical *Aſcites* is True or Falſe. The True is caus'd by a Quantity of Water, that fills all the Cavity of the Belly, and ſwells it extraordinarily. In the Falſe *Aſcites*, the Waters are only contain'd upon the Integuments of the Belly, and do not enter the Cavity.

There are two principal Cauſes that contribute to the Formation of the Dropſy, the Diſſolution of the Blood, and the Slowneſs of the Circulation. The Blood becomes Serous, and incapable of Union, or adhering together, when its Balſamick Parts are diſſipated, either by violent Exerciſe, long Study, great Grief, or profuſe Solution and Exhalation of the volatile Salts, in the Nature of a Flux or Salivation, where there is a Colligation made of all the Fluids. When the Circulation of the Blood is impeded by any Cauſe, the Serous Parts ſeparate themſelves as Whey from Curds.

The *Anaſarca* or *Leucophlegmatia*, is a ſoft aqueous Tumour throughout the Body, eſpecially in the Muſcles, whereon if you preſs your Finger, the Impreſſion will remain ſome Time after. The Signs of the Dropſy, are the Swelling, the Tranſparence or Clearneſs of the Water, the Fluctuation, and a Difficulty of Breathing, a ſlow Pulſe and Fever, a Weight throughout the Body, an inſatiate Thirſt, and a Difficulty in making Water.

We may diſtinguiſh Women with Child from Dropſical Perſons, by the lively and good Colour in their Faces, by the Nature of the Tumour, which riſes in Women with Child towards the Stomach and Breaſt, and is uneven in Dropſical Ones: On the contrary, the lower Part of the Belly is taken up wholly by this Tumour, which is even, and like an *Oedema*, to ſay nothing of the Motion of the *Fœtus*. The Fluctuation is a certain Sign, and the Senſation of Touching; the Vivacity obſerv'd in the Eyes of breeding Women, and the Heavineſs and Lividneſs of thoſe in Dropſies. The Urine is different in a Woman with Child from one in a Dropſy. The Water in Hydropick Bodies fall on that Side you turn to, which happens not to the others. Beſides, Thirſt and the Terms are nothing near ſo familiar to the one Caſe as the other.

The Fever in the Dropſy is caus'd by the Impurity of the Chyle, and the ſaline Waters, which mix themſelves with the Blood paſſing thence into the Heart, where they produce a Ferment, and diſorder'd or irregular Motions. The Heart communicating theſe confus'd Strokes to the Arteries, excite a Fever, which is felt but very weakly, becauſe of the ſmall Quantity of Spirits, that have not Force to ſupport the Blood in a greater Degree of Motion, which occaſions the feeble Pulſe. The pale or languid Complexion, the Weight and Oppreſſion of the Body, and the Slowneſs of the Blood, proceed from the Quantity of Water with which it is loaded, and the Diſſipation of the Spirits, which are as it were dead in the Water. The Difficulty of Breathing comes from the great Tenſion of the Belly, which puſhes the Diaphragm againſt the Lungs, ſo that they have not the Liberty of extending themſelves, the Reſpiration from thence becoming frequent and conſtrain'd. The exceſſive Thirſt ariſes from the Saltneſs of the Water. The Patient has a Difficulty of Urine, becauſe that which uſe to take its Courſe by the Kidneys, now empties it ſelf into the Capacity of the Belly, whence the ſaline Waters irri-

irritating the Urinary Pipes, and the Sphincter of the Bladder; they contract more ſtrongly than ordinary, which hinders the Urine from flowing ſo freely.

Of the Cure of the Diſeaſes of the Liver. *From the ſame Authors.*

AMongſt the Diſeaſes of the Liver, the hot and cold Diſpoſitions are reckon'd in the firſt Place; in the former of which, to wit, the *Intemperies calida*, the following Things are prefer'd: As, Roots of Succory, Graſs, Sorrel, Lettice, Endive, Liver-wort, Raſp'd Ivory, Daiſie Flowers, Violets, Roſes, Spirit of Vitriol martiated, *Mynſicht*'s Tincture and Elixir; the Alterative Decoctions, Whey, Salt of Wormwood, Tamarisk, Nitre vitriolated, *&c.* Thoſe Medicines are likewiſe profitable that diſcharge Bile; as, Syrup of Succory, with Rhubarb, Syrup of Roſes ſolutive, Extract of Rhubarb, *&c.* But in the *frigida Intemperies*, Roots of Monks, Rhubarb and Bur-dock, with Wormwood, Centaury and Agrimony, are uſeful: So other hot Hepaticks; as, *Quercetan*'s Cachectick Powder, Ivory, and *Crocus Martis*.

In the hot Indiſpoſition of the Liver, Take, *Species Diatrion Santal.* Ivory unburnt, Salt of Wormwood, of each one Dram; doſe a Scruple in any convenient Vehicle: Or Take, Tincture of Violets, Roſes, and Daiſies, of each one Ounce; Spirit of Vitriol martiated, half an Ounce; take a Spoonful of this in a Decoction of Succory or Whey: Or Take, Succory Water, Endive, Lettice, of each three Ounces; the Alterative Decoction, four Ounces; Syrup of Berberries, two Ounces; Spirit of Vitriol of Sulphur, *q.s.* make a Julep. Take, Conſerve of Succory Flowers and Roſes, of each an Ounce; Tartar Vitriolate, two Drams; Roots of Succory, and Lettice candied, of each two Drams; Syrup of Black Cherries, *q.s.* make an Electuary with Salt of Succory, and Powder of Flowers of Red Roſes.

In the cold Indiſpoſition: Conſerve of Wormwood, Agrimony, and Centaury, of each one Dram; Salt of Succory, a Scruple; Spirit of Vitriol, four or ſix Drams; for a Doſe. In the Obſtruction of the Liver, Take, Extract of Pills of *Ammoniacum*, *Quercetan*'s Pills of Tartar, the Cachectick Powder, *Crocus Martis*, with the Hepatick Aperitive Salts, or *Mynſicht*'s Hepatick Salt, prepared with *Crocus Martis* ſaccharated; with Spirit of Sulphur, Tincture of Steel tartariz'd, *&c.* What relates to the removing Obſtructions by Urine, are, Tincture of Salt of Tartar, Spirit of Salt, and Tincture of Tartar, with Quick-lime.

Carminatives are likewiſe ſerviceable, with proper Hepatick Waters; ſo Tartar chalybeated, one Dram; Salt of Succory, and Wormwood, of each half a Scruple; divide into three Parts. Take, *Crocus Martis Aperiens*, three Drams; Salt of Wormwood, and Tartar Vitriolate, of each a Scruple; divide into four Parts. Purgatives made of Tartar infus'd in Succory and Endive Water, and afterwards ſweeten'd with Syrup of Succory, with *Rhubarb*, &c. are proper: Or a Bolus of Conſerve of Succory Flowers, one Dram; Powder of Jalap, one Scruple; Scammony ſulphurated, and *Crocus Martis* ſaccharated, of each eight Grains; make into a Bole, with Syrup of Roſes ſolutive.

The Cure of the Inflammation of the Liver is the ſame with the internal Inflammations of the *Lungs*, *Throat*, or *Pleura*; but if this Inflammation turns into a *Scirrhus*, it may degenerate into a *Dropſy*, and an *Atrophy* follow. For the *Scirrhus*, Take, Agrimony, Liver-wort, and Succory, of each a Handful; Roots of Monks Rhubarb, two Ounces; Tartar Vitriolate, Salt of Succory, and Wormwood, of each a Dram; make them into a Powder, to be divided into twelve Parts. To apply to the Liver, Take the Plaiſter of Hemlock, malax'd with Oil of Wax.

Agrimony is proper in all Caſes of the Liver, together with the Juices of Daiſie and Chervil, all which ſerve to diſſolve the grumous Blood. Ulcers of the Liver, ſays *Severinus*, are cured by Inciſion of the Liver; and the Weakneſs of the Liver, according to *Varandæus*, is reliev'd by Agrimony, Succory, Pulp of Raiſins, *&c.* Take, Conſerve of Agrimony, Flowers of Succory, Pulp of Rai-

Raiſins, of each one Dram; Ivory unburnt, two Scruples; the Liver of a Wolf prepar'd, three Drams; make an Electuary with Syrup of *Enula Campana.*

In the Yellow Jaundice.

THE Cure of the Yellow Jaundice conſiſts in remedying of the Concretion, and in the Alteration of the Bile and Pancreatick Juice, which are the Cauſes, and to facilitate by proper Specificks the Precipitation and Evacuation of the Excrementitious Particles of the Maſs of Blood. As the Bile offends us uſually in being too dull and unactive, that is, not ſalt enough, or too oily, thoſe Medicines which profit in this Diſeaſe, are ſuch as are ſaline, acrid, volatile, and aromatick, which reſtore to the Bile its natural Acrimony and Perfection. As to the Pancreatick Juice, that offends in Sharpneſs, it requires Steel Medicines in particular, that are able to abſorb the vitiated Juice; after which, that Fluid returns to its natural State: So likewiſe the *Sal volatile oleoſum*, and the like *Succedaneums*, are proper in the Yellow Jaundice, and the Steels in the Black.

Purgatives are miſchievous in the Beginning of this Diſeaſe, but leſs ſo, as they are gentle and deterſive at the firſt, ſo that they may remove ſome light Obſtruction in the Paſſage of the Gall, that is capable of being reliev'd by a ſingle Purge. In the Progreſs of the Diſeaſe, Purgatives are more uſeful, and Sudorificks in the Declenſion. The Specificks appropriated, are, Horehound, Celandine, Southern-wood, Gooſe Dung, Roots of Celandine, Turmerick, Rhubarb, Flowers of *St. John's Wort*, Saffron, Marigolds, Agrimony, Dandelion, Succory, Wormwood, *&c.* of which take the following Forms of Compoſition: Take, Shavings of Ivory, one Dram and a half; Seeds of Columbine, one Scruple; Powder of Earthworms, half a Scruple; make all into Powder, whereof give a Scruple for a Doſe in Syrup of Succory, with Rhubarb in Dodder Water. Take, of Celandine, a Handful; Leaves and Flowers of *St. John's Wort*, half a Handful; Roſes, Ivory Shavings, and Gooſe Dung, of each three Drams; Saffron, half a Dram; boil all in an equal Quantity of White Wine and *Scolopendria* Water, and ſweeten the ſtrain'd Liquor with Sugar. This ſerves for three Doſes, taken in the Morning. For an Apozem, Take, the Roots of Great Celandine and Fern, Chervil and Madder, of each one Ounce; the Tops of *Roman* Wormwood and white Horehound, Agrimony, Germainder, *Veronica*, and *Hepatica*, of each a Handful; Wormſeed, Shavings of Hartshorn and Ivory, of each four Drams; Citron Sanders, three Drams; Coriander Seed, four Drams; boil all in ſix Pints of Spring Water, to the Loſs of a third Part; then add a Pint of White Wine: In the whole diſſolve four Ounces of Succory, with Rhubarb, and three of Magiſterial Water of Earthworms. The Doſe of this Apozem is four Ounces twice a Day. Take, Leaves of the white Horehound, Roots of Gentian and Turmerick, of each three Drams; Cinnamon, a Dram; Saffron, half a Dram; bruiſe, and then infuſe the whole in a Glaſs Bottle cloſe ſtop'd in a Quart of good White Wine or Rheniſh: The Doſe ſix Spoonfuls.

Forms of Potions, Electuaries, Pills, *&c.* in this Diſeaſe: Take, a Dram of the large Celandine; of the Bezoar Stone, Diaphoretick Antimony martiated from *Ludovicus* Diſpenſatory, of each five Grains; mix the whole for a Bolus, to be diſſolv'd in a Glaſs of Wine for a Potion. Or Take, one Ounce of Dandelion Water; half a Dram of Extract of Celandine; volatile Salt of Hartshorn, eight Grains; Syrup of *Carduus*, two Drams; mix for a Potion, that is very efficacious. For an Electuary: Take, Conſerve of *Roman* Wormwood, the outer Rind of Oranges and Lemons, of each two Ounces; Powder of Aram Root, Ivory, Citron Sanders, Wood of Aloes, of each half a Dram; Crabs Eyes, Troches of *Diarrhodon*, and Rhubarb, of each a Dram; Salt of Wormwood, two Drams; Syrup of Succory or Tumitory, *qſ.* to make an Electuary. The Doſe is the Size of a Walnut twice a Day, drinking after it the following Icterick Julep: Take, *Carduus* Water, one Ounce and a half; Wormwood Water, and that of Earthworms compound, of each ſix Drams; Antimony Diaphoretick, one Scruple; Syrup of Clove Gilliflowers, and Juice of Kermes, of each three Drams. For a Maſs of Pills: Take, Powder of Turmerick Root, Rhubarb, and Earthworms, of each two Drams; the

Tab. X.

1 The Arm of a Man extended.

Some Muscles wch bend ye Elbow & extend ye Arm. 3

The joining ye Cubitus & radius. 4

2 The Arm bent.

5 a Mechanical Demonstration

Some Fibres of ye Muscles. 6

7 Some crooked Carvous Fibres.

8 a Pair of Lungs Bellows wch in'em.

a Bow in 9 Plano.

10 Part of ye Thorax wth ye Ribs.

Part of ye Thorax &c. 11

a Pair of Bellows wth a bladder in ye hole. 12

Tab. VII.

3 The Inferior part of ye Brain &c.

8

4

The Sinus of ye Minings wth ye Falx &c.

2

6

The Substance view'd wth a Microscope.

Tab. VI.

1 a Lobe of ye Lungs.

2 ye Union of ye Bronchia & blood Vessels. 4

The Muscles & Coats of ye Gullet

3

A branch of ye Pulmonary Nerve

5 the internal Superficies of ye Gullet.

6 ye Musculous Coat

7 The back part of it.

Tab. VIII

The Forinx turn'd back. 1

The Forinx being remov'd ye Plexus Choroides remain.

2

Vol 2. p. 652

Tab. VII.

1 *The Head whose Scull & great part of ye Meninges are remov'd.*

The hair viewd wth. a Microscope.

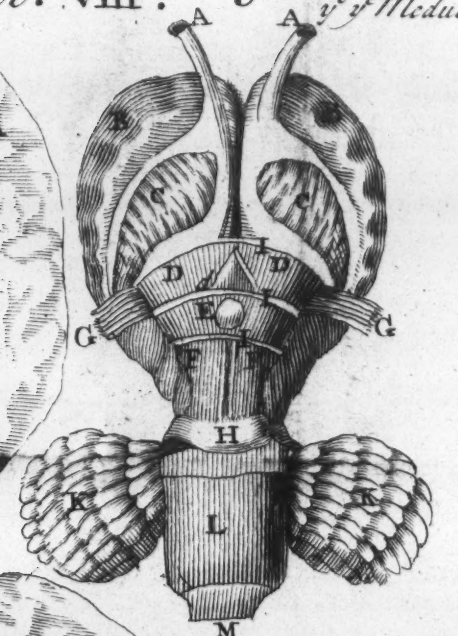
The Sinus ninges &c.

2

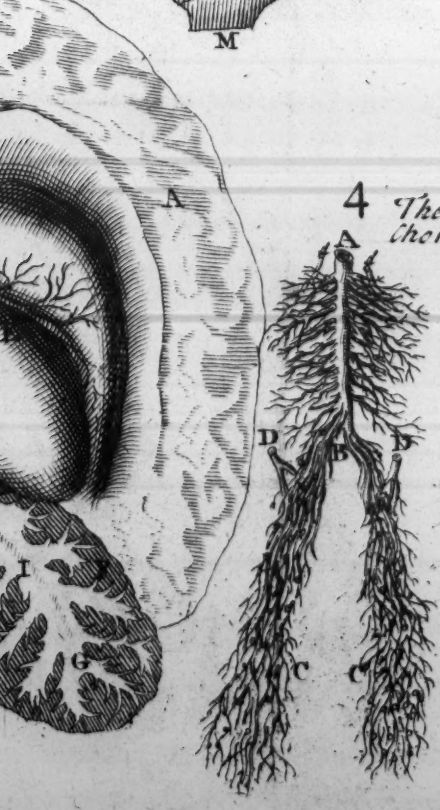
5 *The Basis of ye Scull.*

Tab. VIII.

3 *The Basis of a Sheeps brain spread so ye ye Medullary strice appear.*



4 *The 4th Sinus wth ye choroide Plexus.*



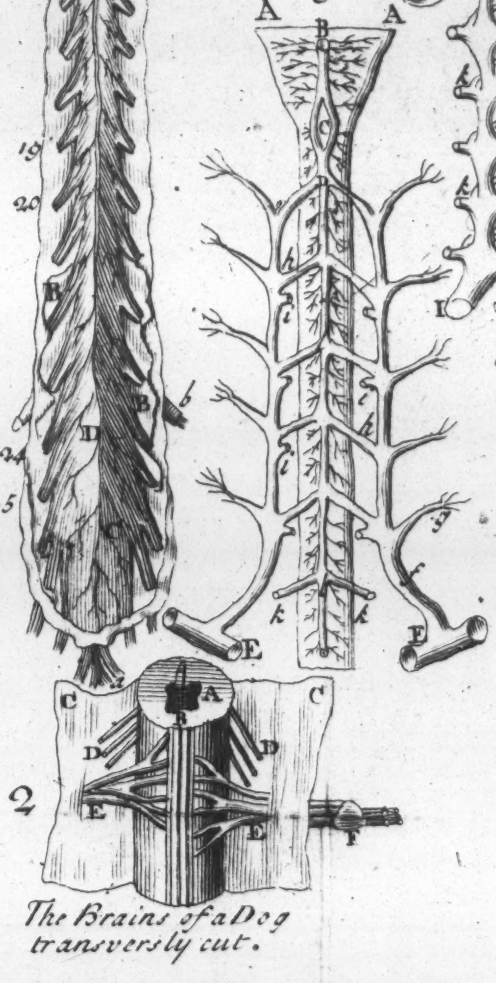
Tab. IX.

1

The Spinal Marrow wth ye Nerves going in & out.

The Vertebral arteries & their branches.

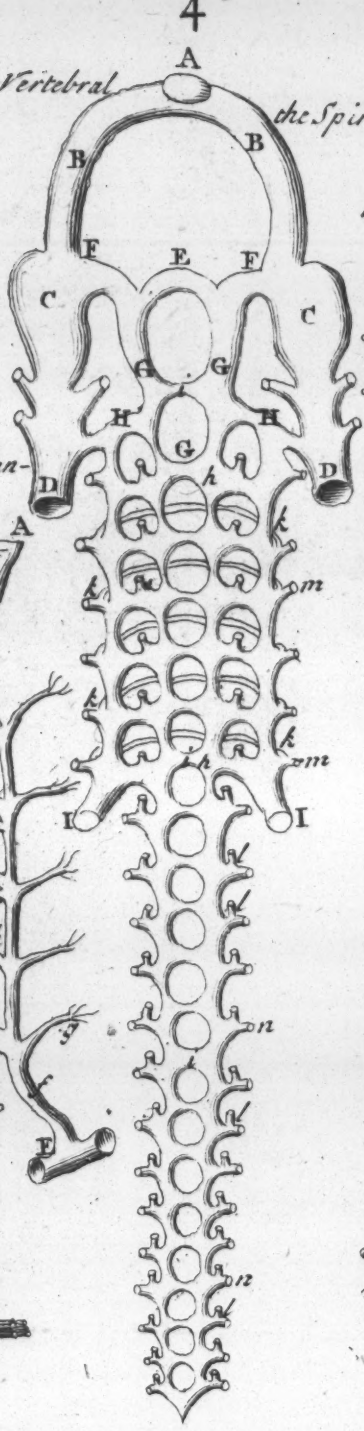
3



2

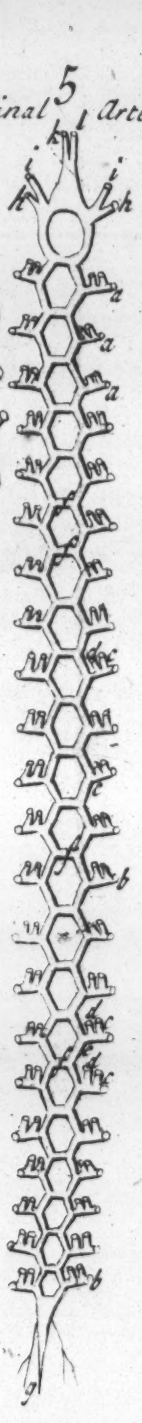
The Brains of a Dog transversly cut.

4



The Veins & Vertebral sinus.

5



the Spinal Arteries &c.

Bark of Capers, and *Azarum* Root, of each one Dram; Extract of Gentian and Centaury, of each two Drams; Salt Armoniack, a Dram; Salt of Wormwood, ſix Drams; Salt of Amber, two Scruples; Saffron, two Drams; *Elixir Proprietatis*, the ſame; Gum Ammoniack, as much as ſuffices; diſſolv'd in Magiſterial Earthworm Water, to form it into a Maſs of Pills, the Dole whereof is half a Dram at Night, and half a Dram in the Morning. The Purgatives ought to be, *Sena* infus'd, with Salt of Tartar; or black Hellebore extracted, with *Mars*; or elſe Rhubarb infus'd in any of the appropriated Waters, *&c.*

In the Black Jaundice, which is eaſily known from the Complexion, as well as Urine, of the Sick, the moſt efficacious Medicines are the volatile and fix'd Salts; as, thoſe of Amber, Salt Armoniack, Hartshorn, Wormwood, Tartar, Centaury, Succory, Tamarisk, Aſh-keys, *&c.* the *Crocus Martis Aperitivus*, the Tartar martiated, *Zwelfer*'s Tincture of Steel, Antimony martiated, Infuſions of Steel and Tartar, with other appropriated Medicines. The propereſt Purgatives are, *Quercetan*'s Pills of *Ammoniacum* tartariz'd, and whetted up with a little Scammony ſulphurated; together with the Alteratives already mention'd.

Of the Dropſy, *and its Cure. From Mr.* Dion, St. Hilaire, Verduc, *and others.*

ALL Authors have laboured in Search of the Cauſe of Dropſies. Some at firſt look'd for it in the Liver, and others in the Milt. The Number of thoſe who accuſe the Liver is the largeſt, by reaſon that being prepoſſeſs'd that it form'd the Blood, they aſcrib'd to that Organ all the ſupervening Irregularities of that Humour, and particularly its Converſion into Seroſities, which diſgorging from its Maſs, and overflowing ſome Part, cauſes all the Diſorders which attend the Diſeaſe of which we have been ſpeaking. What confirm'd them extremely in this Sentiment, was, that after having open'd Dropſical Corps, they found the Liver hard, ſcirrhous, and corrupted both in Subſtance and Colour. They wanted no more to perſwade them that the *Parenchyma* was the ſole Cauſe of the *Dropſy*.

But without detaining you any longer on the Opinion of the Ancients concerning the Cauſes of the *Dropſy*, I muſt tell you (ſays the Author) that I own but one juſt one, which is, the Obſtacle which happens in the Separation of the Seroſity of the Blood by the Reins and Bladder; for no Man whoſe Urine paſſes, will ever become Dropſical; and you may always obſerve, that thoſe who become ſo, don't void ſo much Urine as they before us'd to do: 'Tis then the Total, or in Part, Suppreſſion of Urine, which cauſes this Diſtemper. 'Tis now fit we ſhould examine what thoſe Obſtacles are which impede the Paſſage of the Urine by its ordinary Courſe. I know but Two, which are, either the Rupture of ſome Lymphatick Veſſel, or the Fault of the Urinary Salts.

There are an Infinity of ſmall Veſſels full of a Liquor as clear as Water, call'd the Lymphatick Veins, which wind about the Membrane of the Liver, and which are diſpers'd and ſpread through the whole *Epiploon* and *Meſentery*; that the Tunick of theſe Veſſels is very thin, that they inceſſantly hurry on the *Lympha*, in order to throw it into the Maſs of Blood; and if by any Cauſe whatſoever one of the Veſſels breaks, which may eaſily happen, by reaſon of the Fineneſs of the Membranes, this Water diſtilling by Drops into the Cavity of the Belly, in Proceſs of Time fills it: Hence 'tis eaſy to conceive, that this Liquor, which ſerves to liquefy the Blood, and to charge it ſelf with its ſharpeſt Part, finding a Way to eſcape by ſlow Degrees through the Aperture of one

of its Veſſels, either torn or broken, is not carried in ſuch great Quantity to the Reins, nor doth it any longer ſeparate ſo much Urine as before this Seroſity had taken another Courſe; ſo that it ought not to be ſaid, that the Dropſy is the Cauſe of the ſmall Separation of the Urine, but that thoſe who void but very little Urine, become Dropſical: And be not ſurpriz'd if our Anceſtors never mention'd this Cauſe of the Dropſy, ſince theſe Lymphatick Veins were unknown to them, not being diſcover'd before the laſt Age.

The Deficiency of Urinous Salts, which I have aſſign'd to be another Cauſe of the Dropſy, is not leſs probable. We know, that the Kidneys are of a very compact Subſtance, that they have ſeveral ſmall Mamillary Bodies pierc'd with an infinite Number of imperceptible Holes, by which the Urine ſeparates it ſelf from the Blood, and continually diſtils into the *Infundibulum Renum* or Baſin of the Kidneys, to be convey'd from thence by the Ureters into the Bladder. If this Seroſity, carried to the Reins by the Emulgent Arteries, is either too thick, or too ſweet or freſh, 'tis not difficult to comprehend, that it will not without Difficulty paſs through the Poroſities of theſe Mamillary Bodies, whoſe Subſtance is more ſolid than that of the other Glands: It cannot then be ſufficiently filtrated without the two Qualifications of being ſubtle and ſalt; the one, that it may eaſily paſs through theſe extreme ſmall Pores; and the other, that being charg'd with the ſharp and picquant Points which the Salts carry with them, it may open a Paſſage, which would be denied to an inſipid Liquor, whoſe Particles were too pliant.

The Dropſy is frequently preceded by a great Hæmorrhage, either through the Noſe, *Matrix*, or by the *Hæmorrhoides*, which will not give us much Trouble to explain. After a Loſs of Blood, the Chylous Matter and the Drink being conducted into the Veſſels, they fill, and in ſupplying the deficient Quantity of Blood, they continue their circular Motion; wherefore immediately after the Loſs of Blood, the Surgeon ſhould order Broth to be frequently given to his Patient, that this liquid Aliment may expeditiouſly ſupply the Place of the loſt Blood; but theſe Liquors not having either the ſame Conſiſtence or Penetration as the Blood, they may glide into the Cavity of the Body by ſome unknown Way; and then having began this Road, they continue the Inundations, if (by the Aſſiſtance of Aperitive Remedies) we do not endeavour to force them to return to their natural Paſſage through the Reins, which they ought not to quit.

If we reflect on all the Medicaments us'd to prvoke Urine, we ſhall find that they are Salts, which intermixing with the Seroſity, ſharpen it, and which ſtimulating the Places through which they are to go, make all the Paſſages free, either by dilating them, or irritating the Muſculous Fibres, which muſt force the Liquor to enter theſe Conduits. This Practice proves; and 'tis own'd by Practitioners, that the Urine being too Flegmatick, wants to be acuated, in order to return into its ordinary Channels, and not diſcharge it ſelf into ſome other Part. Daily Experience agrees with what I advance. *Burgundy* Wines being thicker, and leſs poinant, than that of *Champagne*, paſſes alſo ſlower than this laſt, which being more ſubtle, and participating more of a tartarous Salt, cuts and glides with ſuch Precipitation, that it excites Urine ſoon after 'tis drank.

Scarce any Diſeaſe is attended with more certain Signs than this; and the Symptoms that accompany it, are, a ſlow Pulſe, a Ponderoſity of the whole Body, Difficulty of Reſpiration, exceſſive Thirſt; and I do not ſpeak of the Difficulty of Urine, which is inſeparable from all Dropſies, becauſe I regard it as their Cauſe, and not as a ſupervening Accident. In relation to the Prognoſticks of Dropſies, it may be affirm'd, they are generally mortal, rather than pretend to promiſe a Cure, becauſe not One in Twenty have ſucceeded. I don't know why ſome Authors make a Difference betwixt the growing and mature Dropſy; for when a Maſs of Water is diſcern'd to be gather'd in any Cavity, this Diſeaſe is then but too ripe; and when no Part of the extravaſated Seroſities appear, there is no Dropſy: But on the leaſt Suſpicion in any Part, Remedies ought not to be neglected, but we are to endeavour a Cure as ſoon as poſſible: In order to ſucceed in which, Two Things are neceſſary:

First,

Firſt, To evacuate the Waters contain'd in the Belly; Secondly, To prevent the gathering of new ones: And theſe are forc'd out Two Ways, either ſenſibly or inſenſibly, that is, either by Pharmacy or Surgery.

The Medicines furniſh'd by Pharmacy are of Two Sorts, that is, either external or internal. The former muſt be ſtrong Deſiccatives. *Fabricius* relates to have ſeen very good Effects reſult from a large Spunge moiſten'd in Lime Water, and applied to the Belly. In *Egypt*, Dropſical Patients us'd to cure themſelves by expoſing their Bellies to the Sun, or laying them in Sand before heated by the Sun Beams. The Remedies internally taken, are ſo very numerous, that it would be impoſſible to recite them all. They are ſuch as ſtimulate the Urine, force it to the Reins, and by their inciſive and poinant Particles, tend to open a Way for their Paſſage. Theſe are call'd *Aperitives* or *Diureticks*, the ſtrongeſt of which are the Salts of *Millipedes* or *Hoglice*, *Rue*, *Mugwort*, *Tartar*, *Juniper*, and the *Sal Polychreſtum*. The Prior of *Cabrieres*, who gave the King his Secrets, has inſerted amongſt them a Remedy againſt the Dropſy, conſiſting of *Steel File-duſt*, and Spirit of Vitriol, of which he gave ſix Grains every Day. He farther directs the Decoction of Smallage in Claret, adding a ſmall Quantity of *Sena*, and *Chryſtal Mineral*, of which he order'd a ſmall Glaſs to be drank every Morning, preſcribing to his Patients the alternative Uſe of the Powder and this Wine; and above all, recommending to them the Dropping of ſome Drops of Spirit of Salt into their Decoction. With theſe he pretended to cure all Sorts of Dropſies; but though they ſhould be allow'd to be the beſt that we know, we are not ſure of their very frequent Succeſs. If then after the Uſe of them, the Diſeaſe increaſe, Recourſe muſt be had to Surgery, which propoſes to us Two Methods: One of opening the Belly; and the other of making Scarifications only in ſome other Parts, as the *Scrotum*, the Thighs, Legs, or Feet. But though this Way ſeems leſs cruel than piercing the Belly, for my Part (ſays Mr. *Dion*) I prefer Punction on ſeveral Conſiderations; and without dwelling on the Arguments of thoſe who diſapprove the *Paracenteſis*, I ſhould always adviſe to proceed to the Performance of it, rather than abandon the Patient to the utmoſt Extremity, and ſee him die without Help.

Wherefore not to trouble the Reader with uſeleſs Diſputes concerning the Choice of Place for the Puncture, Precautions or Preparatives for this Operation, or the Opinions of the Ancients, we will proceed to the Methods of the Moderns. Theſe latter don't want ſo many Preparatives as the Ancients in order to perform the *Paracenteſis*. They only want Two Things, an Inſtrument, and a Plaiſter. The Inſtrument is call'd a *Trocar* or *Trois-Carts*, that is, three Quarters, by reaſon of its Point being triangular. 'Tis ſhap'd like a *Puncheon*, and its Length is about two or three Fingers Breadth, being excavated throughout its whole Length like a ſmall Pipe, except towards the Point, where are four ſmall Holes laterally placed, by which the Water enters into the Cavity, and runs out of the Body. It is provided with a Head like a Pipe, by puſhing which with the Thumb, one is able to thruſt it into the Body at one Effort; then, by taking the Thumb from the Aperture, the Water runs out as from a Cock. Of theſe *Trocars*, ſome are provided with Handles, and their Needle is plac'd in the Cavity of a ſmall Tube. To uſe either the one or the other, the Patient is ſet in an Elbow Chair, and the Surgeon orders an Apprentice to hold the Sides of the Belly, whilſt he draws the Skin a little upwards, or elſe downwards, at the Place which he deſigns to pierce; then all at once he thruſts in the Inſtrument, as one does a Cock into a Caſk of Wine. He ſets at the Patient's Feet a Baſon, which receives the Water that comes out, which he lets run at Diſcretion. When the Surgeon finds he has drawn enough, he need only pull out the *Trocar*, and the running of the Water will that Moment ceaſe, and not a ſingle Drop more come out, becauſe the Skin, Muſcles and *Peritonæum*, returning, ſtop the Apertures of one another. To this Puncture is apply'd only a Plaiſter of *Ceruſe*, of the Bigneſs of a *French* Fifteenpenny Piece. When the Surgeon deſires again to draw out the Water, he makes new Punctions alternatively on the two Sides as many times as he thinks neceſſary, that one Side may not be

worſe treated than the other, taking Care that the repeated Punctures on the ſame Side be mutually diſtant from each other about two Fingers Breadth.

This Method very much ſurpaſſes the other, and is preferable on all Accounts. It does not require ſuch a large *Apparatus*, the Punction is leſs than uſual, 'tis ſooner perform'd, the Operator is ſecure that the Water will not eſcape, and it requires neither Bolſter nor Bandage, which frequently are troubleſome. I adviſe you then to keep to this laſt Method, of which you will certainly find ſuch good Effects, that you, as well as I, will wholly abandon the old Way, in order to make uſe of no other than the *Trocar*, which has ſav'd the Lives of ſeveral; amongſt others, that of Madam *de Chateauneuf*'s Groom, from whom were drawn above a Hundred and twenty Pints of Water at Twenty five Punctions, and the Patient (ſays our Author) was then alive.

I have already inform'd you, that to cure the Dropſy, Two Particulars were neceſſary; the one to draw out the Water, and the other to prevent the amaſſing of freſh Quantities of it. The firſt Intention is accompliſh'd by the Methods which I have ſhew'd you, and the ſecond by the Application of the internal Remedies; ſo that after the Surgeon has perform'd his Part, the Patient ought not to ſtop there, but on the contrary, ſubmit to the taking of ſuch Aperitive and Diuretick Remedies as are ſufficient to divert the Courſe of theſe Seroſities from the Belly, and force them into the Channel which Nature has appointed for their Evacuation. In this wiſe Reſolution, they ſhould have Recourſe to ſome able Phyſician, who will preſcribe them, with regard to Pharmacy and Diet, ſuch Remedies as they ought to expect their Health from, and of which the following are very prevalent:

Amongſt the Purgatives, *Jalap* and *Gamboge* are reckon'd Specificks; ſo *Mercurius Vitæ* prepared with Gold, is accounted by ſome ſingularly excellent, and does not become Emetick in the Dropſy, becauſe of the Quantity of Salt that is in the Humour, by which the Mercury is precipitated, and the Force of the Medicine leſſen'd. Theſe, or the like Forms, are in Uſe: Take, Extract of *Elaterium*, eight Grains; Gamboge, and Reſin of Jalap, of each five Grains; Powder of Orrice Root, ſix Grains; Oil of Mace, two Drops; make into three Pills for a Doſe. Or Take, Extract of Gentian and Mechoacan, of each a Scruple; Salt of Broom, ſix Grains; make up into Pills, with 2 or 3 Drops of Oil of Juniper. Theſe purge by Stool and Urine. Or Take, *Elaterium*, and Aloes extracted, with Juice of Lillies, of each half an Ounce; choice Maſtick, two Drams; make into a Maſs of Pills, of which take twelve or fifteen Grains in a Morning faſting, repeating the ſame as Occaſion requires. Or where the Spleen or Liver are concern'd, Take, Gum *Ammoniacum* and *Sagapenum* diſſolv'd in Vinegar, and dried, of each two Drams; *Jalap* in Powder, *Rhubarb*, *Scammony*, and *Mercurius dulcis*, of each two Drams; Extract of Juniper Berries, as much as requiſite to form them into a Maſs of Pills; whereof you may give from half a Dram to a Dram.

In Powders, Take, Tartar Vitriolate, twelve Grains; Reſin of Jalap, ten Grains; Troches Alhandal, ſix Grains; Oil of Mace, two Grains; mix for a purging Powder. Or Take, Clean *Sena*, Turbith, Hermodactils, Jalap, and Mechoacan, of each two Drams; Gamboge, half a Dram; Cream of Tartar, three Drams; *Diarrhodon Abbatis*, and Fennil Seed, of each a Scruple; Sugar Candy, two Drams; make a Powder, whereof two Drams may be given for a Doſe, infuſing it all Night in four Ounces of White Wine, and drinking the Infuſion next Morning.

There are Infuſions made of the Salts of the Aperitive Vegetables, as Broom, Tamariſk, Wormwood, *&c.* in White Wine or Rheniſh; as likewiſe Pigeons Dung, Earthworms, *Millipedes*; ſo of Roots of Rhubarb, Mechoacan, Orrice, *Angelica*, Liquorice, *Enula Campana*, Briony, *&c.* ſo Spirits of Salt, Nitre, *Sal Armoniac.* Tartar, volatile Spirit of Urine, Earthworms, Hoglice, *&c.* are given as good Diureticks in proper Vehicles, as Juniper Water, Cinnamon, Saffron, *&c.*

In Form of Electuary, Give, Reſin of Jalap, and Scammony, of each half an Ounce; *Crocus Martis Aperitivus*, Tartar Vitriolate, of each three Drams; Extract of Juniper, two Ounces; Extract of Rhubarb, one Ounce; of Spurge, three Drams; Roots of Galingal, half an Ounce; Cloves, and Cinnamon in Powder, of each two Drams; Con-

Conſerve of the Canker Roſe, eight Ounces; Syrup of Peach Flowers, *qſ.* for an Electuary. Doſe from a Dram to three for a Purgative.

For Alteratives, Take, Tartar Vitriolate, two Scruples; Salt of Succory and Wormwood, of each ten Grains; *Crocus Martis* ſaccharated, eight Grains; divide into two Parts, whereof take one in the Morning, and the other in the Evening, in a Glaſs of Wine, Juniper Water, Magiſterial Water of Earthworms, or the like. Or Take, Salt of Broom and Wormwood, of each ſixteen Grains; Pigeons Dung, and Bean Salt, of each half a Dram; or elſe Salt of Dwarf Elder, and the common, one Scruple; infus'd all Night in Rheniſh Wine, and drunk the next Morning.

In the Form of Clyſter, Take, Agrimony, Flowers of Elder, and *Acacia*, of each a Handful; Roots of Orrice and Briony, of each an Ounce; Bay Berries, ſix Drams; boil them in a Child's Urine; to eight Ounces of which add Electuary of *Hiera Picra* and Bay Berries, of each one Ounce; Nitre, Antimony fix'd, a Dram; adminiſter for a Clyſter. So likewiſe a Boy's Urine exhibited warm is very efficacious in this Caſe, as *Michael* atteſts in his Practice. Or Take this Form: Broom and Elder Flowers, of each a Handful; Cummin and Carui Seeds, of each half an Ounce; boil them in Whey; and to eight Ounces of the Decoction add two Ounces of the Emetick Wine of Antimony; Oil of *Colocynthis*, half an Ounce; Oil of Cummin, the Yolk of an Egg; make a Clyſter.

Of the Diſeaſes of the Spleen, *and their Cures. From the ſame Authors.*

THE principal Diſeaſes that happen to the Spleen, are Obſtructions, Tumours, Inflammations, *Scirrhus*, Wounds, Ulcers, Hypochondriack Affections, Scurvy, and Black Jaundice; but as all theſe have been in ſome Manner treated of before, and depend on the Diſeaſes of the Liver, except the Hypochondriack Affections, I ſhall paſs the reſt by in this Place, and confine my ſelf only to that, ſo far as it may be ſaid to relate to the Part. *Etmuller* allows it to be a Pain with Heavineſs and Conſtriction at the Stomach or Diaphragm, and throughout the Meſentery, that is owing to the Convulſion of the Nerves of theſe Parts, occaſion'd by the acid Viſcidity of the Humours, that prick upon the firſt Paſſages, and eſpecially the nervous Parts of the Ventricle.

The Complaints of the Patient make us ſenſible that the Pain is with Weight and Conſtriction, which they liken to being trod croſs the Stomach with one Foot, ſo that there being Contractions, the neighbouring Parts, and eſpecially the Stomach, ſuffer in the Contractions; for the only eſſential Part attack'd in this Diſeaſe, according to *Highmore*, *Barbette*, and *Heckſter*, is the Stomach, which is found by the Pain we feel at the Pit of the Stomach, which is directly oppoſite to the Orifice. The immediate Cauſe of this Diſeaſe is the Convulſion of the Nerves, caus'd by a viſcous Acid, which the Ancients call'd *Succus Atrabilaris* or a Melancholy Acid. The chief Receptacle of this morbick Matter, is the Stomach, as the frequent Belchings and ſowr Vomitings teſtify. As to the Belchings, they take their Riſe directly from the viſcous Matter, in which they are bred ſucceſſively, as the Effervеſcence laſts, and in which they are confin'd as Air in a Bottle of Water, and the more Viſcidity there is in the Body, the more Wind there is; for the Belching or Wind is nothing elſe but Air pent up in the Pores of the viſcous Matter, that is produc'd or fed by the Food, which being driven out from theſe Pores, and chiefly from thoſe of the alkaline Particles,

by the Acid that expels it, it dilates it ſelf by its Elaſtick Power in the Conflux, and joining it ſelf to the more ſubtle Vapour of the Matter that ferments, ruſhes out, and brings along with it the Odour of the *Fæces* left behind. It is evident, that the Vomiting in theſe Kind of Diſaffections is acid, from their Stupor, and ſetting the very Teeth on Edge in paſſing; and *Highmore* has obſerv'd, that they ſometimes exulcerate the Lips, the Mouth, and the Throat.

When the Guts are full of ſuch-like windy Matter, there is a Grumbling and Noiſe in the Belly: When the Matter remains in the Cells of the Inteſtines, particularly that of the *Colon*, it produces by its Sharpneſs the Pains and obſtinate Prickings which the Ancients attributed to a *vitiated Pituita*. The Patients complain of certain Diſorder in the *Abdomen*; and when you ask where the Place is, they commonly ſhow the *Colon* ſituated under the Stomach, which makes it that Hypochondriack People are ordinarily troubled with the Colick. The remote Cauſes are of different Sorts: Amongſt thoſe that are natural, are the hot or cold Temperament of the Ventricle, according to the Ancients; and the *acid Diſcraſy*, according to the Moderns, which is very common to the Northern People of both Sexes, and of all Ages.

Amongſt the Nonnaturals, is an acrid Air, full of acrid Salts, that are rais'd up into the Pores, and obſtructed or ſtop'd there by the aqueous Vapours, which is evident in Autumn and Spring-time, which are vulgarly call'd the Rheumatick Seaſons. The Air of this Kind infects the *Saliva*, and deſcends with it into the Stomach, where it communicates a vitiated Reliſh to the Aliment that is in the Stomach; among which are ill made Bread, Gruel made of Water, and Meal without Fermentation, Fiſh, *&c.*

The Suppreſſion of Evacuation is likewiſe the Cauſe of this Malady, which happens ſometimes to Young and Breeding Women upon the Suppreſſion of their *Menſes*, and to Men who deprive themſelves of the Uſe of Venery. When the Veſſels are too full, the Circulation of the Fluids is ſlower, and conſequently they grow thicker. This Diſeaſe does not depend only on the viſcous acid Matter, but alſo on the unnatural Irritation of the firſt Mover or *Archæus*, that directs the Motion of the Nerves. Amongſt theſe Things againſt Nature, are all the ſudden Suppreſſions, and Fevers ill treated or manag'd, eſpecially the Intermitting Kind. As to the Difference of the Hypochondriack Diſeaſe, it is divided into what is Acquired, and what is Hereditary.

As to the Diagnoſtick Signs, they perceive Pains with Weight and Tenſion, that begin at the Region of the Loins, run along the *Abdomen* with very ſenſible Contorſions, paſſing forwards, and ſtretching to the *Vertebræ* of the Neck. When the Diſeaſe is confirm'd, it redoubles its Pains after Eating, with raging Heat, and Difficulty of Breathing. The Deſire of Sleeping is common, eſpecially to Young People. Wind and Belching are almoſt continual, notwithſtanding the ſtubborn Conſtipation of the Belly. *Vertigo's*, Head-aches, Reſtleſneſs, Fear and Sadneſs without any manifeſt Cauſe, are conſtant Attendance. Sometimes the Men have the ſame Symptoms with Hyſterick Women. The Pulſe is uncertain, uneven, and changes every Moment in the Paroxiſm, and out of the Paroxiſm. It is ſometimes moderated as to its Largeneſs, and ſlow. The Urine new made is uſually of a yellowiſh Colour, thick, but tranſparent. It is ſometimes muddy and pale, with a great deal of Salts. When it has ſtood a little, it precipitates to the Bottom a great deal of viſcous Matter, and Sand inclining to Red, which deceives many ignorant Phyſicians, who blame the Stone in the Kidneys, becauſe of the Pain in the Loins. What remains further to be ſaid of this Diſtemper, will be examin'd when we come to treat of the Fluids of the Body, and the Diſeaſes ſubject thereto.

If Symptoms may be ſaid to vary in any Place or Affection, certainly they do it here. It is call'd therefore the Tartar of the *Hypochondriack*, which (if it remains long) degenerates into a *Scurvy*. Clyſters are recommended where the Body is tied up, which ought to be open'd in the firſt Place. Emeticks agree, but not ſuch as are too ſtrong. The *Acidulæ* or Mineral Waters, eſpecially ſuch as are of the Chalybeate Kind are the beſt; but if an Ulcer happen in the Spleen or the Caul, and the Stomach be too weak, then

then the Uſe of the Mineral Waters is not proper, except the Stomach be firſt corroborated. *Caſſia* ought not to be adviſ'd, becauſe it is too flatulent; neither *Myrobalans*, becauſe they leave the Belly bound; but *Elixir Proprietatis*, and Medicines compos'd of Tartar, are to be ſubſtituted.

If this Diſaffection ariſe from a Conſent of the Stomach, Take, Pills of *Hiera*, with Agarick; the Stomach Powder of *Quercetan*, Salt of Wormwood, Chryſtals of Tartar, *Mynſicht*'s Stomach Salt, *&c.* If it comes from the Liver by a Conſent of Parts, Give, Whey, with the Spirit of Vitriol Chalybeated, Spirit of Tartar Vitriolated, with the Juices of ſome Specifick Herbs, *&c.* If from the Womb, add the Powder of Arum or Briony; to the Purgatives join Roots of Briony and Birthwort; ſo Balm, Motherwort, and Penny-royal, are proper. Digeſtives and Purgatives are directed to the Parts affected, whether to the Liver, Spleen, or Womb: Or ſometimes Medicines are preſcrib'd that are both Aperitive and Purgative; or more properly, Purgative in the Morning, and Aperitive at Night.

The Digeſtives are, Tartar Chalybeated, Arum Root, *Crocus Martis Aperitivus*, with the lixiviate and fix'd Salts, *Sal Armoniac.* and Salt of Tartar, Columbines, Succory, Agrimony, the five opening Roots, Liverwort, Fumitory, *&c.* The Purgatives are, Rhubarb, Polypody, Black Hellebore, Spurge, Jalap, Cream of Tartar, *Sena*, Gum *Ammoniacum*, Scammony ſulphurated, Syrup of Succory, with Rhubarb, Syrup of Apples and Roſes Solutive. Cordial and Aperitive Remedies are, *Elixir Proprietatis*, Juice of Ground Ivy, Fumitory, *&c.* *Zwelfer*'s Tincture of Steel, Tincture of Tartar Chalybeated, Tincture of Tartar with Antimony, Conſerves of Borage, Bugloſs and *Balm*, *Species Diarrhodon*, *Crocus Martis*, Juice of Alkermes, Hartſhorn, Maſtick, Mint, Tartar Vitriolate, *Mynſicht*'s Epatick Salt, *Vitriolum Martis*, *&c.*

Take the following Forms, as moſt efficacious in Hypochondriack Melancholy, Scurvy, *&c.* Take, the Juices of Water Creſſes and Scurvigraſs, of each an Ounce; Juice of Fumitory, two Ounces; White Sugar, one Ounce; mix for a Potion, to be taken faſting. Or elſe, Take ſix Spoonfuls of Juice preſs'd from Archangel or dead Nettle in the Spring-time, with the Addition of a little White Wine in the ſtamping, and ſweeten this with fine Sugar.

A Cordial Water, Pills, and an Infuſion, in Hypochondriack Caſes: Take, Flowers of Borage, Bugloſs and Stœches, of each half an Ounce; of Roſemary, Marjoram and Balm, of each half as much; Roots of Bugloſs, four Drams; Betony, two Drams; Borage and Bugloſs Water, of each four Ounces; Powder of Galangale, Cinnamon, Cloves, Saffron, of each a Dram; mix all, and digeſt in five Pints of good White Wine two or three Days; then diſtil, and let the Patient take four Spoonfuls as Occaſion ſerves. Take, Troches of Rhubarb, Powder of Arum, Winters Bark, of each three Drams; *Virginia* Snake Root, *Contrayerva*, and Crabs Eyes, of each two Drams; Extract of Gentian and Centaury, of each two Drams; Salt of Wormwood, the ſame; Vitriol of Iron, one Dram; mix all for a Maſs of Pills, with *Ammoniacum* diſſolv'd in Magiſterial Water of Earthworms; whereof take four or five Pills in the Morning, and ſometimes after them a Glaſs of Wormwood Wine, wherein Tamariſk has been infus'd, or the like appropriate Liquor. This is excellent for a cold or windy Stomach. Or Take, Spirit of Earthworms, five Ounces; *Sal Armoniac.* half an Ounce; Spirit of Scurvigraſs, two Drams; in which diſſolve two Ounces of *Venice* Soap, ſix Drams of Camphire, a Scruple of *Opium*, and half a Dram of Saffron; mix, and digeſt them together ſome Days; then filter, and give forty Drops in a Glaſs of Wine, or Cordial Water, for a Doſe.

Off

Of the Diſeaſes of the Kidneys *and* Bladder, *and their Cures. From* Cyprianus, *Mr.* Raw, St. Hilaire, Dion, Michaelis, *&c.*

THE principal Diſeaſes of the Kidneys, are, Inflammations, *Scirrhus*, Wounds, Ulcers, Stone, Gravel, *Diabetes*; and Nephritick Pains. The Inflammation of the Kidneys proceeds from the ſame Cauſe with that of the Liver. The Signs are hot or ſcalding Urine, when it comes quick and painful, the Pains increaſing when the Patient lies upon his Back. The Pain is ſometimes with Pulſation, to wit, when the Part of the Kidney wherein the Arteries are inſerted, is inflam'd. Sometimes the Pain is in the Ureter, and extends even to the Bladder and the Back. A Numbneſs ſeizes the Hip on that Side the Kidney is affected. Sometimes an obſtinate Vomiting attends by the Conſent of the Stomach. Beſides the Diagnoſtick Signs of theſe Inflammations, there are others to diſtinguiſh them from the Stone. The firſt is, that a *Febris Synochus* is always join'd with an Inflammation of the Kidneys, and not with that of the Stone, or if ſo, very rarely. The ſecond is, that the Pain is continual, and with a Kind of Pulſation, in the Inflammation of the Kidneys, inſtead of being intermitting, periodical, and with Weight, in the Stone. The third is, that an Inflammation of the Kidneys is attended with a Heat of Urine, and ſometimes with the *Iſchuria*, which is not met with in the Stone in the Kidneys, except when it is ſtop'd in the Ureters.

The *Scirrhus* is produc'd after the ſame Manner as that of the Liver and the Spleen, by the Coagulation or Thickneſs of the Blood, and other Fluids, in the Texture of the Glands. The Signs are, that the Patient makes little Urine, that the Pains reſt in the Loins almoſt continually; and ſometimes the Iſchury, Dyſury, and Dropſy, with Waſting, is join'd to this Diſtemper, eſpecially when it is of long Standing.

Ulcers of the Kidneys ſometimes ſucceed the Abſceſs or Inflammation of the Parts, which may be occaſion'd by the Sand and Roughneſs of the Stones, that lacerate and tear the Veſſels of the Kidneys: Or in ſhort, they may happen from the *Pus* or purulent Matter brought thither from another Part, which is diſcharg'd into the Reins, and by its Acrimony ulcerates the Parts. The Signs are, a gnawing or grinding Pain upon the Loins, with more or leſs Weight, and a purulent Urine. Thoſe who void ſmall fleſhy Rags, like Hairs, with thick Urine, void them from the Kidneys. If the Ulcer comes from an Inflammation, there is a great deal of *Pus* in the Water, that appears white in making, but being ſettled, the *Pus* ſeparates: If it is well boil'd, and the Urine like that in a State of Health, it won't ſuppurate. When the Eroſion comes from the Stone, the Urine flows white like Butter-Milk, it precipitates as well as the former, and becomes of another Conſiſtence, which is like Aſhes in Colour, and gives leſs Pain in making. There is likewiſe another biting and corroding Pain in the Loins, from an acrid and vicious *Serum*, that irritates and corrodes in paſſing, with a Senſe of Heat. Ulcers of the Kidneys are difficult to cure, very dangerous, and ſometimes mortal. Thoſe that come from an Inflammation ſuppurated, are leſs dangerous, and much eaſier to cure than thoſe that come from the Stone.

In Wounds of the Kidneys, the Patient makes not Water but with Difficulty, the Urine is bloody, and the Pain ſtrikes to the very Groin. When Wounds in the Kidneys are very deep, they are mortal. The Ston

ſtop

ſtops ſometimes the flowing of the Urine by the Bladder, when it is in the Kidneys, and makes a Stoppage of the Separation; and when it is in the Bladder, it ſhuts the Neck of it and the Ureter, by which Means the Urine is hinder'd from running.

Of the Stone *in the Kidneys or Bladder.*

WE daily find Stones in the Reins and Bladders of Men, and there are but few which do not, with their Urine, void Sand, Gravel, or ſome Sort of Stone; but it is very difficult to know how, and in what Place, theſe Bodies can be generated. All our Authors which to this Time have written on this Subject, and amongſt others, *Fernelius*, who (after *Hippocrates*) has taken moſt Pains in the Explication of it, have told us, That theſe Stones were form'd from the moſt viſcous and terreſtrial Part of the Urine; That the moſt ſubtle Part of this Excrement being conſum'd by the Heat of the Reins, the groſſer petrifies and hardens, as Pots of ſoft and pliable Earth do by the Heat of the Furnace; and that then the Pores through which the Urine ſeparates it ſelf from the Blood being too narrow, the thickeſt Particles of the Urine ſtopping in theſe Conduits, petrify by their long Continuance there, and the Heat of the Parts, where they increaſe by a continual Acceſſion of Matter; ſo that (according to them) there were but Three Cauſes of the Generation of Stones, the Material, the Inſtrumental, and the Efficient.

They were confirm'd in this Opinion, from their daily Obſervation, that Children are more ſubject to the Stone than grown Perſons, and eſpecially thoſe fed with groſs and terreſtrial Aliments; the Reaſon of which is, that Children eating very often, cannot perfectly digeſt; and amongſt others, thoſe of Peaſants, which feed on nothing but courſe Bread, ill bak'd, and ill made, Cheeſe, and leguminous Plants of ill Digeſtion; there remains a crude and indigeſted Juice, which being convey'd to the Reins with the Blood, ſtops in the Poroſities of the Mamillary Caruncles, and ſtaying there, grows hard, and petrifies by the natural Heat, which cauſes the Expreſſion out of the Teats of all the Serous Part of this Juice, ſo that theſe three Cauſes juſt mention'd, happening moſt frequently to center in Children, 'tis not ſurprizing, if we find ſo many of that Age afflicted with the Stone. The Proof of what is here advanced, is manifeſted by the Scrophulous Tumours, Kernels under the Ears, Excreſcencies, and other Swellings of the Glands, which frequently happen to Perſons in the firſt Age.

This Opinion concerning the Cauſe of the Generation of Stones, appear'd ſo probable to all the Ancients, that no Perſon ever dar'd to conteſt it with them; but ſome Moderns have been ſo bold as to aſſert, that thoſe who believe that Stones reſult from the groſſeſt Part of the Blood, are in the wrong, affirming the contrary; and to defend their *Hypotheſis*, they diſtinguiſh Two Principles in the Urine; the one a volatile Urinous Salt, like Spirit of Nitre; and the other an Etherial Sulphur, which participates of the Nature of Spirit of Wine. To prove this, they have Recourſe to Chymiſtry, alledging, that if we mix Spirit of Wine with Spirit of Nitre or *Sal Armoniac.* after ſome Fermentation, it immediately turns into a *Coagulum*, which may grow to a ſolid and compact Body, like that of a Stone.

I am ſo far from condemning thoſe of this Sentiment, that I think they have deſerv'd our Praiſes; but yet they ought not to expect us blindly to follow them, but examine without Prejudice, and take which Side is moſt reaſonable. This laſt Syſtem is that of the ingenious *Van Helmont*, who, with the three Spirits which I have mention'd, had Occaſion for another Spirit of Petrifaction. But though the Imagination can ſcarce repreſent to it ſelf all theſe Principles, yet this modern Opinion is not uſeleſs to us; for reconciling it with the ancient *Hypotheſis*, they will together afford us ſome Lights which will conduct us to the true Knowledge of the Generation of the Tartarous Subſtance of which the Stone is form'd.

Some Authors make Two Sorts of Stones, one of which (they tell us) is form'd in the Reins, and the other in the Bladder. They diſtinguiſh them, by repreſenting that in the Kidneys to be ſmalleſt, lighteſt, and reddeſt; and will have that in the Bladder to

be bigger, harder, and whiter; adding, that old Men are moſt liable to the Stone in the Kidneys, and younger Perſons to that in the Bladder. The eſſential Principle or Foundation of the Stone is always ſome Particle of groſs and ill digeſted Chyle, which being carried along with the Urinary Seroſity to the Reins, and inſinuating it ſelf into one of the ſmall Tubes of the Mamillary Bodies, which filtring the Seroſity, become clogg'd and ſtop'd up; ſo that by the Aſſiſtance of the coagulating or acrid Spirits, it hardens and grows ſtony. The Tartarous Part of the Urine coming afterwards to touch this ſmall Beginning of a Stone, ſticks to, unites with, and augments its Bulk; and a freſh Supply of the Tartar of Urine daily joining it, it grows till the continual Courſe of this Fluid forces it to looſen, and fall into the *Pelvis Renum* or Baſin of the Kidney, from whence, by the *Ureter*, it is conducted into the Bladder; where finding a vaſt and free Space, it continues more eaſily, and grows bigger and bigger by freſh Acceſſion of Matter, till at laſt, by its Bulk, Weight or Point, it occaſions inſupportable Pains and Inconveniencies, and forces us to extract it by Operation.

The firſt Principle, which ſome term the Seed of the Stone, and which is call'd the Kernel by *Fernelius*, not being able to paſs through the ſmall Teats of the Renal Glandules, augments it ſelf by the ſeveral Lays of freſh Tartar, like Comfits, which are cover'd with ſeveral *Involucra* of melted Sugar, in which the Confectioner dips them from Time to Time: For if you break a Stone, you will then obſerve the Kernel with its ſeveral Lays, which will be of different Colours, according to the various Matter of which they are compos'd. When I told you, that Stones, after that Formation, fall into the Baſin of the Kidney, you ought to have underſtood me, that it very frequently, but not always, happens ſo; for ſometimes the Stone is ſo ſhap'd, that it is impoſſible for it to diſengage it ſelf from the Pipe wherein 'twas firſt form'd; when it grows as in the Bladder, and may increaſe to ſuch a Bulk as to kill the Patient, of which there daily happen ſeveral Inſtances; the moſt famous of which is that of Pope *Innocent* XI. who dying on the 13th of *Auguſt*, 1689. was open'd, and in each Rein was found a Stone, that in the Left Kidney weigh'd nine Ounces, and that of the Right ſix.

When a Stone diſengages it ſelf from the Kidney, and makes its Way to the Bladder, if ſmall, it ſlides eaſily into that Purſe; but if great, being oblig'd to dilate the *Ureter* in order to its Paſſage, it occaſions violent Pains, which are proportionably increas'd by the Inequalities and ſharp Angles with which it lacerates and pricks the nervous Membrane of that Tube. This Diſeaſe is often term'd the Nephritick Colick, but improperly, being really no other than a Nephritick Pain, or a Pain in the Kidneys, and not in the Inteſtine call'd the *Colon*. Theſe Nephritick Pains are excited by the Sand or Gravel: When they proceed from the former, they are but light, at leaſt if the Quantity of the Sand be not very great; but when they are owing to the latter, they are more ſenſibly felt, becauſe the Particles of the Gravel are rough, irregular, and coarſer than thoſe of Sand; and when 'tis a Stone, they are more violent, in which Caſe Recourſe is had to General Remedies, which are frequently preſcrib'd purſuant to the Accidents which preſs hardeſt.

The Signs which diſcover to us *Nephritick Pains*, are, that they begin about the Kidney, continue along the *Ureter*, and tend to the Region of the Bladder; the Patient is ſenſible of a Numbneſs in the Thigh, the Teſticle on that Side is drawn up by the Cremaſter Muſcle, which is in Pain; he cannot void his Urine without Complaint, but vomits upon this Occaſion. The Remedies in this Caſe will be found in common Practice. After this Explanation of the Production of the Stone, take the ſame Author's Sentiments concerning the Formation of Sand or Gravel. As you ſee the Tartarous Part of Wine adhering to the interior Surface of the Cask in which it is contain'd, that it ſticks to the Veſſels in which thick Liquors are boil'd, and that it forms it ſelf into a Cruſt within the Tubes, through which Water continually runs: In like Manner, theſe Sorts of Corpuſcles contain'd in the Urine, conglutinate in the Baſin of the Kidneys, and along the Ureters, and being there coagulated by an acid Spirit, or by the Intermixture and ſtrict Union of their branch'd Parts, they pe-

petrify, and at laſt ſtop the Paſſages, if the viſcous Humour inceſſantly ſeparated by the Glands of the Ureters, or moiſten the Cavities, leſt the Membranes ſhould be prejudiced by the Urinous Salts, does not forcibly looſen this Tartar by ſlow Degrees, that it be waſh'd by the Urine into the Bladder, into which it accordingly falls divided into ſmall Particles like Sand, of which there are few Perſons who don't daily void ſome in their Urine. This Sand is frequently white, and ſometimes reddiſh, and appears at the Bottom of the Chamber-pots; and if the Urine be left in them for ſome Time, we find the ſame Tartar ſtick to their Sides, and grow into a Cruſt; from whence we may ſecurely conjecture, that Urine contains a Matter proper for Condenſation, and a Spirit capable of performing that Petrification. There is alſo a *Stone*, whoſe Nature is ſandy, which is form'd in the Bladder from ſeveral ſmall Grains of Sand, which unite together by Vertue of a viſcous Matter, which ſerves them inſtead of a Cement. This Sort of Stone is gather'd in a ſmall Time, and is not ſo hard as that compos'd of ſeveral Lays one over another, but eaſily broke by the *Forceps* in Extraction.

Before *Lithotomy* or the Operation of cutting for the Stone be perform'd, 'tis requiſite that we be ſatisfied there is a Stone in the Bladder. The Signs whereby to know it are of Two Sorts, either Common or Equivocal, or Proper and Univocal. The firſt are very numerous: The Patient is afflicted with a continual Pain in the Region of the Bladder, which increaſes when he attempts to make Water, that makes him defer as much as poſſible that Evacuation; but the Pain grows yet more violent by reaſon of the long Continuance of the Urine in the Bladder, where inflaming and growing ſharper, it more irritates the Parts thro' which it paſſes in order to its coming out: Beſides, the Patient vehemently ſtraining in order to accelerate the Evacuation, the *Inteſtinum Rectum* extends it ſelf outwards by his Endeavours to piſs. This Accident very ſeldom happens to Perſons of an advanced Age, but frequently to Children, and is call'd the Falling out of the Fundament. The Urine of Patients in the Stone is ſometimes white, crude and thin; and at other times, thick, muddy and bloody; and when left to ſettle, we find at the Bottom a Sediment like *Pus* or Matter, and withal both mucous and ſandy. The Patient feels a Preſſure on the *Perinæum* from the Weight of the Stone, frequently carrying his Hand to his Yard, which he pulls to eaſe it. He is alſo ſenſible of involuntary Erections of that Part, produc'd by an Irritation which the Ureter eaſily communicates to the perforated Nerves. He finds a frequent Punction about the End of his Yard; his Urine comes from him with Difficulty, frequently Drop by Drop, and ſometimes is wholly ſuppreſs'd. Tho' all theſe Symptoms commonly denote the Exiſtence of the Stone in the Bladder, they are not yet certain Signs; but thoſe which are, are ſuch as we call Univocal, becauſe they cannot regard any Thing but the Stone, and never deceive; and theſe are Two, the firſt the Finger of the Operator, and the other the Probe.

If by the Probe the Surgeon is fully convinc'd that one or more Stones are in the Bladder, the ſole Way of extracting them is by Operation, which is perform'd one of the two Ways which ſhall be demonſtrated to you; for 'tis a Miſtake to think that there are any Medicaments capable of diſſolving a Stone in the Kidneys or Bladder. All the boaſting Pretenders to the Diſcovery of any ſuch Remedies, are Empiricks and Impoſtors, who taking Advantage of the miſerable Condition of the Patient, and his fearful Apprehenſions of this Operation, promiſe more than they can perform. 'Tis then but a poor Refuge to hope for a Cure by Medicaments: When the Stone is once form'd, nothing but *Lithotomy* can draw it out of the Bladder; ſo that 'tis the Patient's Part frankly to determine in Favour of the Operation, and with utmoſt Expedition diſpoſe himſelf for it, when the Probe has convinc'd him, that all the Evils which he ſuffers are the Effects of a Stone in the Bladder; for the longer he defers it, the more the Stone increaſes, and the Performance of the Operation becomes the more difficult and painful. But if upon Probing no Stone be found, and yet the Patient continues to feel the Accidents which it uſually occaſions, and particularly the Suppreſſion of Urine, the moſt fatiguing of all of them, the Surgeon muſt

relieve him as ſoon as the Caſe will permit, either with regard to it as the Diſeaſe it ſelf, or the Effect of another Diſtemper.

The Suppreſſion of Urine is of ſuch Importance, that 'tis ſcarce poſſible to retain ones Water above one Day, without being reduc'd to the laſt Extremity. When the Surgeon is come to the Patient, this Diſeaſe requires no Delay; for frequently in theſe Caſes he is not ſent for till the Patient has been long without voiding any Urine, and though never ſo little deferred, the Bladder yet fills more and more, the Pain and Danger augment; for which Reaſon the Surgeon ought immediately to go to Work; for the Moments are highly valuable, and 'tis not in his Power to give a too expeditious Satisfaction to the Impatience of the Afflicted, who with moſt preſſing Inſtances begs his Aſſiſtance. Theſe Reaſons have engaged us to ſhew the Methods of relieving the Suppreſſion of Urine, before we demonſtrate the Operation of cutting for the Stone, which we ſhall refer to the Diſeaſes of the Privy Parts, and proceed.

There are Three Sorts of Suppreſſion of Urine, each of which is diſtinguiſh'd by its peculiar Name. When the Patient does not void his Urine without Difficulty, this Indiſpoſition is call'd *Dyſuria*, by reaſon its Paſſage is accompanied with Difficulty and Pain. When the Patient piſſes only Drop by Drop, this Diſeaſe is call'd the *Strangury*, becauſe no more than a Drop comes at once. If the Urine paſſes not at all, 'tis an *Iſchuria*, being a total Retention, and entire Suppreſſion of Urine. There are Two Sorts of Suppreſſion of Urine; the one, when that Fluid is contain'd in the Bladder; and the other, when 'tis ſtop'd above the Bladder.

We find Five or Six Cauſes which obſtruct the Paſſage of the Urine out of the Bladder. 1. When ſome Stone is placed at the Mouth of the *Urethra*; 2. When the *Urethra* is ſhrivel'd or ſunk; 3. When an Inflammation happens; 4. When 'tis occaſion'd by a ſluggiſh thick Flegm; 5. When the Bladder being too full, the Fibres are too much extended, and loſe their ſpringy Motion, ſo that they are no longer able to compreſs or ſqueeze the Urine out of the Bladder; 6. When there are Caruncles or a Carnoſity in the Paſſages. We find Two Cauſes which hinder the Paſſage of the Urine into the Bladder. The Firſt is a malignant and continual Fever, which by its exceſſive Heat ſo inflames the Parts, and eſpecially the Kidneys, whoſe Pores are too cloſely lock'd up, or the Fibres too much relax'd, or whoſe Ferments are ill diſpos'd for the Separation of the excrementitious Seroſity of the Blood: The Second, is when the Urine is detain'd above the Bladder by Stones either in the Reins or Ureters. The Forms of Medicines generally made uſe of, are Baths, Embrocations, Plaiſters, Unctions, Humectations, Fomentations, *&c.* applied to the *Yard*, *Pubes* or *Perinæum*, or introduc'd into the Bladder through the Yard, which would be needleſs to deſcribe here, a Thouſand Authors having treated of them.

The Cure by the Aſſiſtance of the Inſtrument is either Palliative or Curative. That call'd Palliative, is when we relieve the Symptom only, as by thruſting back the Stone to give Paſſage for the Urine: The Curative, is when we remove both the Diſeaſe and the Cauſe, as when the Obſtructive Humour and the Urine iſſue out by the Inſtrument which is introduced into the Organ. Theſe Operations are done by the Catheter, which is an excavated and curved Probe, which ſerves to draw the Urine out of the Bladder, and diſcover the Diſeaſes of that Organ. There are of theſe Probes adapted to both Sexes. The Ancients made them of Horn; they were afterwards of Copper, but are all at preſent of Silver. They muſt be hollow quite through, and their Cavity provided with a Pin or *Stiletto*. Here we might treat of the Uſe of the Probe in order to draw off the Urine; but there being no Difference betwixt that and the Introduction of that Inſtrument to ſearch whether there be any Stone, we ſhall refer to that Head. The Probe being thruſt into the Bladder, the Pin or *Stiletto* muſt be drawn out, to make way for the Urine to run through the Canal of the Probe. All the Urine being thus drain'd off, the Probe muſt be gently drawn out, and this Operation renew'd as often as the Patient wants to make Water, as long as the Suppreſſion continues.

'Tis not always in the Surgeon's Power to make the Water paſs by the Probe, becauſe there

there are frequently Obſtacles to the Introduction of that Inſtrument into the Bladder, and how dextrous ſoever he may be, he cannot get it into that Organ. Theſe Hindrances are either an Inflammation in the Neck of the Bladder and the *Proſtatæ*, whereby nothing can paſs through the *Urethra*, or the Calloſities of that Paſſage; or laſtly, ſome Tumours or membranous Productions which ſtop the *Urethra*. But notwithſtanding all this, the Patient muſt not be left to periſh, and nothing but a Punction of the *Perinæum* can ſave his Life; for he muſt of Neceſſity void his Urine, or die. 'Tis then the Surgeon's Buſineſs to advertiſe the Patient's Relations and Friends of the Danger; after which, having diſpos'd the *Apparatus*, he muſt place the Patient on the Edge of the Bed, and lay him on his Back, his two Thighs wide extended, and his Knees bent ſo that his Heels touch his Buttocks, cauſing his Legs to be held in this Poſture by two Servants, and the *Scrotum* to be rais'd up by another: Then the Operator taking an Inſtrument made on purpoſe for that End, ſhap'd like a Lancet, of about four Inches long, he thruſts it directly into the Bladder, beginning the Puncture on the Buttock's Suture, in the ſame Place where the Inciſion is uſually made in *Lithotomy*, and he will diſcover what is in the Bladder, by what iſſues out of the Sides of the Inſtrument; before he withdraws which, he muſt gently thruſt a ſtraight Probe along the Side of it into the Bladder. This Probe muſt be guided with the Left Hand, and the Inſtrument drawn out with the Right, with which the Operator next takes a Silver Pipe of four Inches long, with two Rings at its Head, thro' which a Riband is run of an Ell and a half long. The hind End of the Probe is then paſs'd into the fore End of the Pipe, which ſerves to conduct it into the Bladder; for if the Inſtrument which made the Puncture ſhould be drawn out before the Introduction of the Probe, the Surgeon would run a Riſque of wholly loſing his Way when he endeavours to thruſt in the Pipe; wherefore the Probe is abſolutely neceſſary by way of Precaution. After the Urine is all voided by the Pipe, we ſtop the exterior Aperture of that Inſtrument with a ſmall Linen Tent, and leave it in the Wound. The Riband run through the two Rings of the Pipe, ſerves to faſten it to a Girdle, to prevent its ſlipping out of the Wound. Whenever the Patient would make Urine, the Tent muſt be taken out, and the Bladder thus emptied as ſoon as filled.

Of the Diabetes, Bloody Urine, *&c.*

THE *Diabetes* is either True or Falſe. The True, is where what is drunk is made by Urine without being chang'd or alter'd: The Falſe is a plentiful Excretion of Urine. Though the Cauſe of a Falſe *Diabetes* appears difficult to find out, we may nevertheleſs attribute it to the frequent Uſe of Diureticks, which make fat People grow extremely lean by the copious Flood of Urine they occaſion; ſo that it is probable, that the Maſs of Blood, the Chyle, the nutritious Juice, and in ſhort, the very Fat, runs or liqueſies, and is converted into this watry Liquor that flows by the Urinary Paſſages. The Reaſon of this Fuſion or Colliquation and Plenty of Urine, proceeds from the ſaline Acrimony of the *Serum* of the Blood which is ſeparated; and this is manifeſt from the Acridneſs of the Urine at the Beginning of a *Diabetes*, upon which Account one feels a corroding Heat. Beſides, this Diſeaſe is cured almoſt after the ſame Manner as the Hectick Fever, to wit, by ſuch Things as are capable of tempering the Acrimony of the *Serum*, as Milk, Whey, *&c.* In ſhort, this Kind of *Diabetes* ſometimes comes from the exceſſive Uſe of Diureticks, which being loaded with ſubtle Alcalies, render the Maſs of Blood too acrid, melt or diſſolve the nutritious Fluid, and drive it out by Urine.

The True *Diabetes* depends on the too great Relaxation and Aperture of the Paſſages by which the Urine from the Drink is convey'd from the Stomach to the Kidneys or Urinary Parts, perhaps by ſome ſhorter Way, though that remains yet a Secret. There is no Inconſiſtence in the Suppoſition, becauſe Emulſions of ſweet Almonds, and Mineral Waters, ſhall mix with the Blood, and circulate therewith, without any conſiderable Alteration, which would incline one to believe there was a ſhorter Paſſage. In fine, what *Salmuthius* has obſerv'd, is very rare;

rare; for he mentions a *Diabetes* ſucceeding a malignant Fever, in which the Drink paſs'd without any Change in it.

The Signs of the *Diabetes* are plain. In the True One, you need but compare what you drink with what you piſs. The Falſe *Diabetes* begins ſucceſſively, and grows inſenſibly, which makes it difficult to diſcover at firſt. It happens ſometimes, that a plentiful Evacuation is the Work of Nature, with Advantage to the Patient; but when Loſs of Strength is join'd to a Leanneſs of Body, that the Fat ſwims in the Urine, there is Dryneſs in the Mouth, Thirſt, Heat at the Back, and the like Symptoms, theſe are Signs of a Falſe and Dangerous *Diabetes*; the Urine is ſometimes aqueous and pale, and in a Word, very crude and raw.

The True *Diabetes* betokens little Danger, and ſtops ſometimes of it ſelf: The Falſe is ſometimes very dangerous, and ſometimes mortal, bringing the Diſeas'd into confirm'd Phthiſicks, *&c.* It is a Conſequent of immoderate Labour, Exceſs of Venery, or Chronick Fevers, and is moſt commonly incurable.

The Diſorders of Urine which ariſe moſtly in Practice, are either Greaſy or Bloody Urine. The Greaſy Urine is that which appears floating like a Scum upon the Water; but you ought to take Care not to confound it with a Salt Scum, that looks like Greaſe, and is uſually ſeen in Scorbutick and Hypochondriack Patients. All the Difference conſiſts in this, that the Salt ſhows it ſelf upon the Urine of various Colours like the Rainbow, which is an infallible Sign of the Scurvy, *&c.* whereas the Greaſe or Fat that ſwims upon the Urine, is without Colour, and is diſtinguiſh'd in little Drops, that are not to be met withal in the ſaline Scum, the fatty Urine ariſing from the Colliquation or Fuſion of the Fat of the Body, which is the Reaſon why the Urine appears ſometimes ſo greaſy in a Burning or a Hectick Fever. This Evil is eaſy to remedy by removing the firſt Cauſe, and furniſhing the Patient with ſubtle and moderate Acids.

Bloody Urine is that wherein we find more or leſs of Blood mix'd with it, and is ſometimes like Waſhings of raw Fleſh; ſometimes it is redder, or otherwiſe more inclinable to black. The Blood which reddens the Urine, comes commonly from the Kidneys, or is mix'd there with it. It often comes from the Ureters and the Bladder, but very rarely from other Parts, except by a Fall, when the Blood mixes with the Urine. Bloody Urine likewiſe comes from the *Anaſtomoſes* of the ſmall Veſſels of the Urinary Pipes: Sometimes it ſucceeds the violent Agitations and exceſſive Motions of the Body, and ſometimes attends the ordinary Suppreſſions of Blood, as that of the *Hemorrhoids* and *Menſes*. We may obſerve a Periodical Menſtrual Piſſing of Blood, which ſtopping ſuddenly, cauſes a Suppreſſion; and a Burning Fever has been cured by a plentiful Diſcharge of Bloody Urine, which ſhows us, that Bloody Urine is likewiſe Critical, and finiſhes or terminates the Diſeaſe. It comes ſometimes after a Fall upon the Back or Loins, and the Piſſing of Blood is occaſion'd by the *Anaſtomoſes* of theſe Veſſels, which the Fall opens. The Tearing of the Kidneys, Ureters or Bladder, by the Paſſage of the Stone, likewiſe procures it. *Cantharides* taken inwardly, or the ſame applied externally in Bliſters without Acids, that is to ſay, without being mix'd with Vinegar or Leven, cauſes a very painful Bloody Urine. It attends ſometimes malignant Fevers, and eſpecially the Small-Pox, by its Eroſion of the minute Veſſels in the Kidneys, which is a very dreadful Symptom.

The Diagnoſtick Signs are very evident; for it is eaſy to ſee if the Urine be ting'd with Blood, and to diſcern a bloody Redneſs from a ſaline One; for the Redneſs of the Salts is reſplendent, tranſparent and clear; whereas that from the Blood is opaque, thick and muddy, according as there is more or leſs Blood in it. It is of great Importance to diſtinguiſh the Cauſe that occaſions Bloody Urine. If it be the Conſequent of a Fall, it ſhows that the extravaſated Blood is carried off by the Reins: If it be from an Ulcer of the Kidneys, we may find the Blood comes from thence: If the Stone, or other remarkable Things, have paſs'd before, the whole or both the Kidneys are concern'd. It ought to be well inquired into, whether it is a Natural Motion or Periodical, which happens without any Vice of the Urinary Paſſages. We ought not to ſtop a Flux that is

Salutary, being far wide of what is Morbifick; for thoſe Symptoms are Ulcers, Sharpneſs of Urine, Strangury, and the like Diſaffections, which ſhow that the Blood comes from the Bladder by the breaking of ſome ſmall Veſſels. If it is from external Cauſes, by *Cantharides*, Turmerick, that colours the Urine red, *Indian* Figs, that do the ſame, or the like, we may be inform'd from the Patient.

Of Medicines proper for the Cure of the Stone *in the* Bladder *and* Kidneys, Gravel, Bloody Urine, Inflammations *and* Ulcers *of the* Kidneys *and* Bladder, Suppreſſion *of* Urine, Dyſury, Strangury, *and* Iſchury, Diabetes, *and* Incontinence *of* Urine. *From Mr.* St. Hilaire, *&c.*

THE Cure of the Stone conſiſts in Two Things, in appeaſing or eaſing the Pain in the Time of the Paroxiſm or Fit, or bringing away the Stone out of the Fit, having firſt emptied or cleans'd the Bowels. To give Eaſe in the Pain, and move the Stone, Take, Violets and Mallows, of each half a Handful; Pellitory of the Wall, a Handful; Roots of *Althea*, one Ounce and a half; Camomil Flowers, three Pugils; boil all in a ſufficient Quantity of Urine; add to the ſtrain'd two or three Drams of Turpentine diſſolv'd in the Yolk of an Egg, half an Ounce of Oil of Lillies, a Dram of Oil of Scorpions, and make a Clyſter. For a Potion, Take, Juice of Pellitory of the Wall expreſs'd, Juice of freſh Lemons, and Oil of Sweet Almonds, of each one Ounce and a half; make a Julep, of which take a Spoonful or two four or five times a Day. Baths likewiſe powerfully allay Pains, prepar'd with Emollient, Carminative, or Lithontriptick Vegetables.

For Internals, Take, pure Turpentine, one Scruple; Rhubarb, two Scruples; Amber, half a Dram; Cinnamon, half a Scruple; Oil of Turpentine, *q. ſ.* for a Doſe of Laxative Pills. Or the following Decoction: Take, *Althea* Roots, one Ounce; Liquorice, two Drams; Mallow Leaves, a Handful; Violet Seeds, half an Ounce; boil all in a due Quantity of Barley Water, to a Quart of which add two Ounces of Poppy, and two Drams of Crabs Eyes; drink four Ounces of this Morning and Evening. Or Take, Mallows and *Althea* Seeds, of each three Drams; of the four cold Seeds, of each two Drams; Barley pearl'd, two Ounces; eight fat Figs; ſix Drams of Liquorice; boil all in three Pints of Water to a Quart, to which add ſome Drops of ſweet Spirit of Salt. This Decoction has cured a Suppreſſion of Urine where Life has been deſpair'd of, and remov'd the moſt tormenting Pains of the Stone. After the exceſſive Pain is reliev'd, you may give the following Diuretick, or the like.

Take the Powder of *Millepedes* in a Morning faſting in White Wine, wherein firſt Broom and Elder Flowers have been infus'd; or elſe in a Wine made with the Fruit of Alkekengi or Winter Cherries. This Water is very prevalent: Take, of white Onions chop'd ſmall, four Pounds; white Sugar, two Pounds; White Wine, a Pint and a half; diſtil all in *Balneo Mariæ* to a Dryneſs, and give three Ounces of this Water every Morning faſting for ſome Days. The Salts of Garlick, Beans, Broom, and Tartar Vitriolate, given from half a Dram to a Dram,

Dram, does Wonders in bringing away the Stone. Or Take, Roots of *Aſparagus*, Saxifrage, Golden Rod, and Sun Dew, of each two Pounds, Plant and Root; Vinegar of Squills, three Pints; Juice of Lemons, three Pounds; burnt Glaſs, Bole, of each one Pound; mix all, and diſtil. The Doſe of this is about half an Ounce in Wine, or ſome Aperitive Decoction. Or Take, *Sal Prunella*, Chryſtals of Tartar, Salt of Ivy Berries, and Leaves of Water Creſſes, of each equal Parts; Turpentine boil'd in Roſe Water; form theſe into Pills with ſome convenient Syrup, as Marſhmallows, and Ground Ivy, whereof the Doſe is a Dram every Morning. For a Potion, Take, Alkekengi and Saxifrage Water, of each ſix Drams; Syrup of Pellitory of the Wall, one Dram; the Panchymagogue Extract, and that of *Crollius*, of each half a Dram; Tartar Vitriolate, a Scruple; make a Potion. Beſides all theſe, there are *Sal Polycreſt.* Spirit of Nitre, Spirit of Salt, Spirit and volatile Salt of Urine, Urinous and Vitriolick Salts, Tincture of Salt of Tartar, Spirit of Wine tartariz'd, volatile Salt of Karabe; Preparations of ſeveral Stones, as that of *Judea*, the *Lynx*, *Hematitis*, and Sparr; Spirit and Oil of Turpentine, and many others, that are adminiſtred in Stone and Gravel. But the three following Preparations are extraordinary in their Kind: Take, Broom Seed, a Dram and a half; Frog Spawn, a Dram; *Millepedes* prepared with Spirit of Vitriol, two Scruples; Juice of Radiſh, one Ounce; Lemon, the ſame; White Wine, two Ounces; Liquor of Chryſtal, and Spirit of Vitriol, of each three Drops; mix, and make a Potion. Or Take, Tartar Vitriolate, Salt of Onions, two Drams and a half; *Sal Prunella*, three Drams; make a Powder, whereof two Drams is a Doſe. Take, Honey, two Parts; Turpentine, one Part; mix theſe with dry Sand, and diſtil in a Retort, and give of the Oil drawn from thence four or ſix Drops in the Morning, and Wine Pimpernel and Saxifrage Water mix'd. It is ſingular in the Stone.

The Cure of Bloody Urine conſiſts, 1. In correcting the burning or exulcerating Acrimony of the *Serum*; 2. In conſolidating the Wounds open'd by Corroſion; 3. In ſtrengthening the Parts by Aſtringents. In a Word, all the Medicines taken Notice of for ſweetening the Blood, are proper againſt Bloody Urine. Take, of Agrimony, Yarrow, Flowers of *St. John's Wort*, and the Moſs of the Sloe Tree, of each a Handful; Roots of Conſolida, Seed of *St. John's Wort*, of each two Ounces; chop, and ſtamp theſe; then boil in White Wine. Take of this Decoction with Crabs Eyes. Or Take, Conſerve of Roſes and Comfry Root, of each two Ounces; ſeal'd Earth, Bole, Dragons Blood, Red Coral, *Hematitis* Stone, and Troches of Karabe, of each one Dram; *Hypociſtis*, Kermes, and Plantane Seed, of each a Scruple; Syrup of Poppy and Myrtles, *q.ſ.* to make it into an Opiate, of which take the Size of a Nut Morning and Evening, drinking thereupon a little Plantane Water.

But amongſt all the Remedies, the moſt efficacious and readieſt at Hand, is that of Syrup of Violets, with a few Drops of Spirit of Sulphur or Vitriol. In Bloody Urine that proceeds from the Bladder, Injections may be made with Water or Juice of Plantane, and a Dram of Troches of Karabe; or elſe an Emulſion of Poppy Seeds, with *Hematitis* Stone in Powder; and to hinder the grumous Blood that remains ſometimes in the Bladder, when the Blood is ſtop'd from cauſing a Suppreſſion of Urine, Amber may be given to diſſolve it, and all the ſuccinated Medicines, which are reckon'd Specificks in this Caſe.

The Cure of the Inflammation of the Urinary Bladder is like that of the Kidneys; for the Remedies which agree with the one, are proper for the other. The Specificks are ſuch as temper or qualify the Acrimony of the Humours, becauſe the Urine frets the Ulcer: They are ſuch as deterge the Ulcer without pricking; or Mundificatives, becauſe of the acid Leven of the Ulcer, and the *Pus* that follows: They conſolidate, becauſe of the Reſolution of the Part corroded: And they are Anodines, by reaſon of the extraordinary Pain. Take, of Agrimony, Plantane, and Horſe-tail, of each half a Handful; Liquorice, two Drams; boil all in Plantane Water, *q.ſ.* to the Loſs of a Third; diſſolve in half a Pint of the ſtrain'd Liquor two Ounces of Honey of Roſes, and make a cooling temperating Injection. Or Take, two Ounces of Liquorice, a Pugil of Red Peaſe,

Peaſe, a Handful of Plantane; boil theſe in Water, to which add a little *Lixivium*, and to a Pint of the Decoction put two Ounces of Turpentine diſſolv'd in Honey, and make a Deterſive Injection. If the Grief is great, add *Unguentum Egyptiacum*. To conſolidate the Ulcer, Take, Horſe-tail, Plantane, *St. John's Wort*, of each a Handful; Biſtort Root, Comfry, and White Lilly, of each one Ounce; Pomegranate Bark, three Drams; boil in Smith's Water, and diſſolve in the ſtrained half an Ounce of *Rhaſis*'s White Troches, as much *Opium*, and an Ounce of Bole. The following Injection is good for Ulcers at the Neck of the Bladder, and the flowing of Blood by the Yard: Take, *Roman* Vitriol, two Drams; common Water, a Pint; make a Decoction.

The Cure of the *Iſchury* or Suppreſſion of Urine conſiſts of Three Things: Firſt, in removing the Cauſe which ſtops the Paſſage of Urine; in giving Diureticks internally to provoke Urine; and in exciting or ſtrengthening the Bladder by Topicks. If the Diſorder proceeds from the Fault of the Nerves, acrid or pungent Clyſters that are moderately purgative, are proper; if from ſome other Cauſe, Emollients: So Fomentations, Cataplaſms, or Baths, are made of the ſame Herbs, plying the Patient at the ſame Time with Drops of Amber in Water, or Spirit of Juniper. If the *Iſchury* proceeds from an exceſſive Extenſion of the Bladder, Fomentations may be us'd of Pellitory of the Wall, Aniſeed, Camomil Flowers, Melilot, Linſeed, Fœnugreek, and Leaves of *Origanum*, with Cataplaſms of the ſame, with Oil of Scorpions.

If the Grief lies in the Obſtruction of the *Urethra*, we muſt alter our Medicines according to the Nature of the Caſe. When the Malady is caus'd by a viſcous and mucilaginous Subſtance, wild Radiſh, Tartar Vitriolate, Nitre Tartariz'd, Salt of Tartar, *&c.* are proper Inciſives. Spirit of Gum *Ammoniacum* compound, and ſweet Spirit of Salt, are efficacious to incide and force the Urine at the ſame Time. In ſhort, if the Diſorder be in the Yard, or in the Neck of the Bladder, by Tumour, the *Becabunga* applied in Form of a Fomentation or Pultiſe, with Camomil Flowers, is excellent; if in the *Pus*, Oil of Amber drunk in Wine is a good Medicine.

The Cure of the *Diabetes* conſiſts in removing the Cauſe from the Diſeaſe, and curing it by Aſtringent and Nervous Medicines; for all Aſtringents, Neuroticks, and Antiparalitick Things, are proper in general. The Incontinence of Urine in Age is cured by Calaminth, *Alchimilla* and Agrimony. Take, Quince Seeds, two Ounces; Fleabane, ſix Ounces; *Citrinel Myrobalans*, Dates, and Red Coral, of each two Drams; Karabe, half a Dram; pound and mix theſe together, and with Loaf Sugar make 'em into an Electuary. The Doſe is half an Ounce every Morning, drinking the following Potion after it; Take, Plantane Water, two Ounces; Syrup of Comfry and Roſes, of each ſix Drams; Crabs Eyes, two Scruples; make a Draught. Or Take, Roſes and *Spodium*, of each ſix Drams; Purſlane Seed, Coriander, and Bay Berberries, of each two Drams; Camphire, one Dram; reduce 'em to a Powder, and make 'em into Troches with the Juice of the Pomegranate. The Doſe is a Dram in the Morning faſting, in Plantane or Lettice Water, and Syrup of dry'd Roſes.

The Cure of the Strangury, or the Flowing of the Urine Drop by Drop with Pain, conſiſts, 1. In rectifying and correcting the Stomach by Vomits and Purgatives, compos'd of Turpentine, Jalap, Rhubarb, and *Mercurius dulcis*, that are Specificks; 2. To precipitate and temper the Acid by the following Remedies: Take two Crawfiſh, ſtamp 'em in a Mortar with a little Wine or Beer, preſs out the Juice, and give it in the Strangury as a preſent Relief. Take, Frankincenſe, Myrrh, Maſtich, of each two Drams; Amber, Saffron, of each half a Dram; Camphire, a Scruple; a Dram of Antimony Diaphoretick; with a ſufficient Quantity of Turpentine diſſolv'd in Spirit of Wine Tartariz'd; make 'em into Pills, whereof one Scruple is a Doſe. A Cataplaſm of Pellitory of the Wall, boil'd in Oil of Scorpions, and applied upon the Navel, is excellent. When this Malady is rebellious, we muſt have Recourſe to Emollient and Anodine Clyſters, with Injections of Milk Chalybeated, and Oil of ſweet Almonds, thrown into the Bladder, to temper

the Acrimony of the Urine. At the ſame Time give ſweet Oils internally, with Syrup of Marſhmallows, and Crabs Eyes.

The Cure of the *Dyſury* or Heat of Urine, conſiſts, in tempering the Acrimony of the Urine, and healing the Exulceration of the Bladder: For which End, make uſe of a Decoction of Barley, Sebeſtens and Liquorice, Morning and Evening, with Syrup of Poppy, *&c.* Or Take, Conſerve of Violets and Roſes, of each two Drams; White and Red Sanders, of each a Scruple; Purſlane Seed, a Dram; Troches of Camphire, one Dram and a half; Syrup of Poppy, *qſ.* to make an Electuary; whereof two Drams is a Doſe Morning and Evening. Or Take, Alkekengi Berries, twelve; Cucumber and White Poppy Seeds, of each half an Ounce; White Sugar, *qſ.* make into a Powder, give half an Ounce before Eating. Or Take, *Olibanum*, Myrrh, Maſtich, Amber, Bole, Dragon's Blood, Antimony Diaphoretick, of each equal Parts; make 'em into Pills with *Chio* Turpentine.

EXPLANATION *of the Figures relating to the whole Cavity of the* Thorax. *Taken from* Lower, Vieuſſens, Verheyen, *&c.*

TAB. I.

Fig. I. *Explanation of the Breaſts and Diaphragm.*

A. The whole Breaſt.
a. The Nipple.
b. The round Circle, with its Tubercles.
B. The Breaſt diveſted of its outward Covering.
c, c. The Blood Veſſels.
C. The Knitting together of the Cartilages of the Ribs with the Membranes.
D. The Diaphragm.
E. The *Vena Cava.*
F. The Deſcending Trunk of the *Aorta.*
G. The Veins of the Liver cut off.
H, H. The Kidneys.

Fig. II. *The Breaſt freed from its Integuments, and divided or ſeparated from the Body.*

A. The Glandulous Subſtance of the Breaſt.
b, b. The Milk Veſſels.
c. The Nipple.

Fig III. *Part of the Nipple view'd by a Microſcope.*

A. All the Integuments remov'd.
B. The Subſtance of the Nipple, being partly Glandulous, partly Vaſcular and Fibrous.

Fig. IV. *Part of the Breaſt, with the Nipple.*

a, a. The *Anaſtomoſes*, whereby the Milk Veſſels appear to inoſculate one with another, according to the accurate *Nuck.*

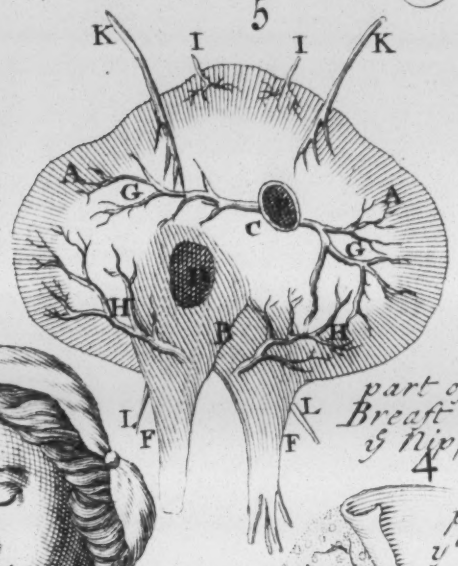
Tab. I.

The Breast clear'd from its Integuments

2

The Upper part of ye Diaphragma freed from ye Body

5



part of ye Nipple view'd in a Microscope

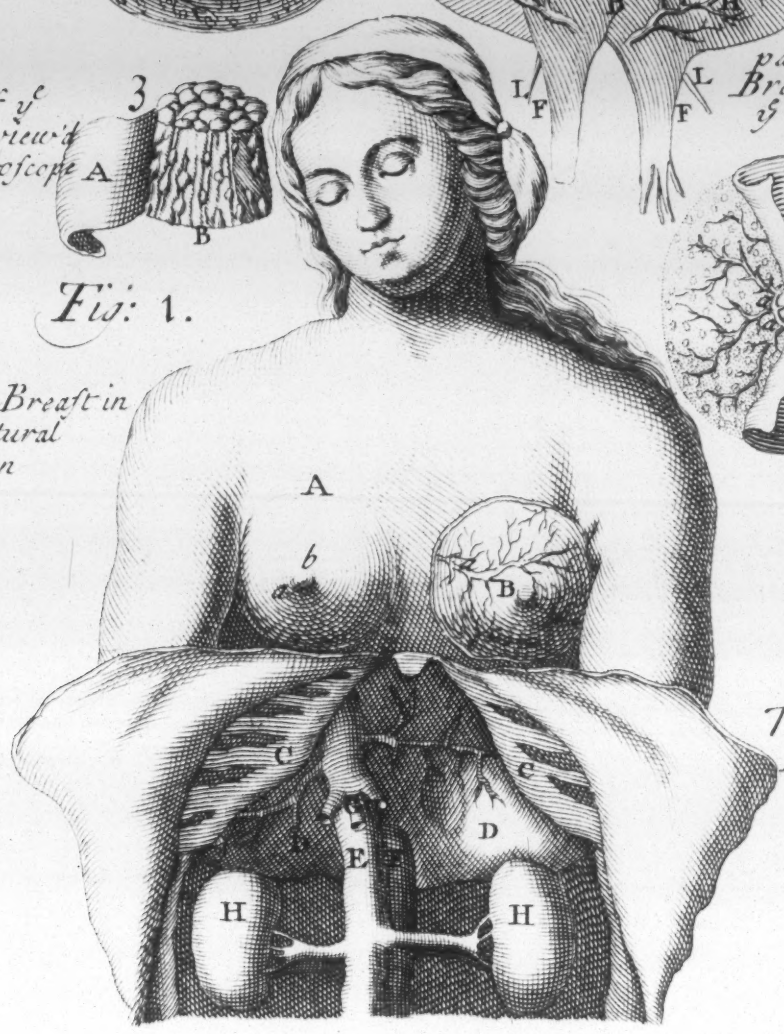
3

part of ye Breast with ye Nipple

4

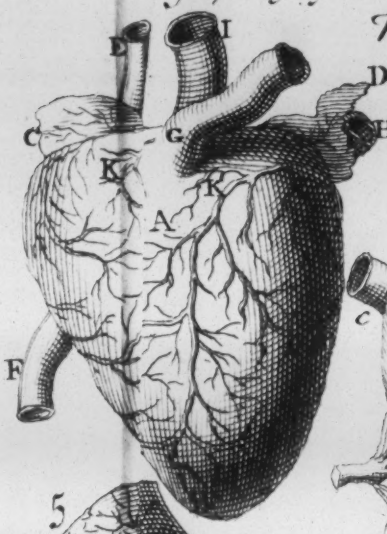
Fig: 1.

ye whole Breast in their Natural situation



The Heart taken out of ye Body

Tab. II.



part of ye Artery yt opens into ye Cavity of ye Heart to shew ye semi-lunar Valves.

5

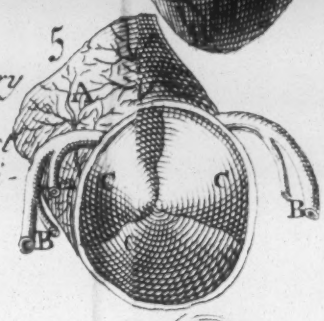


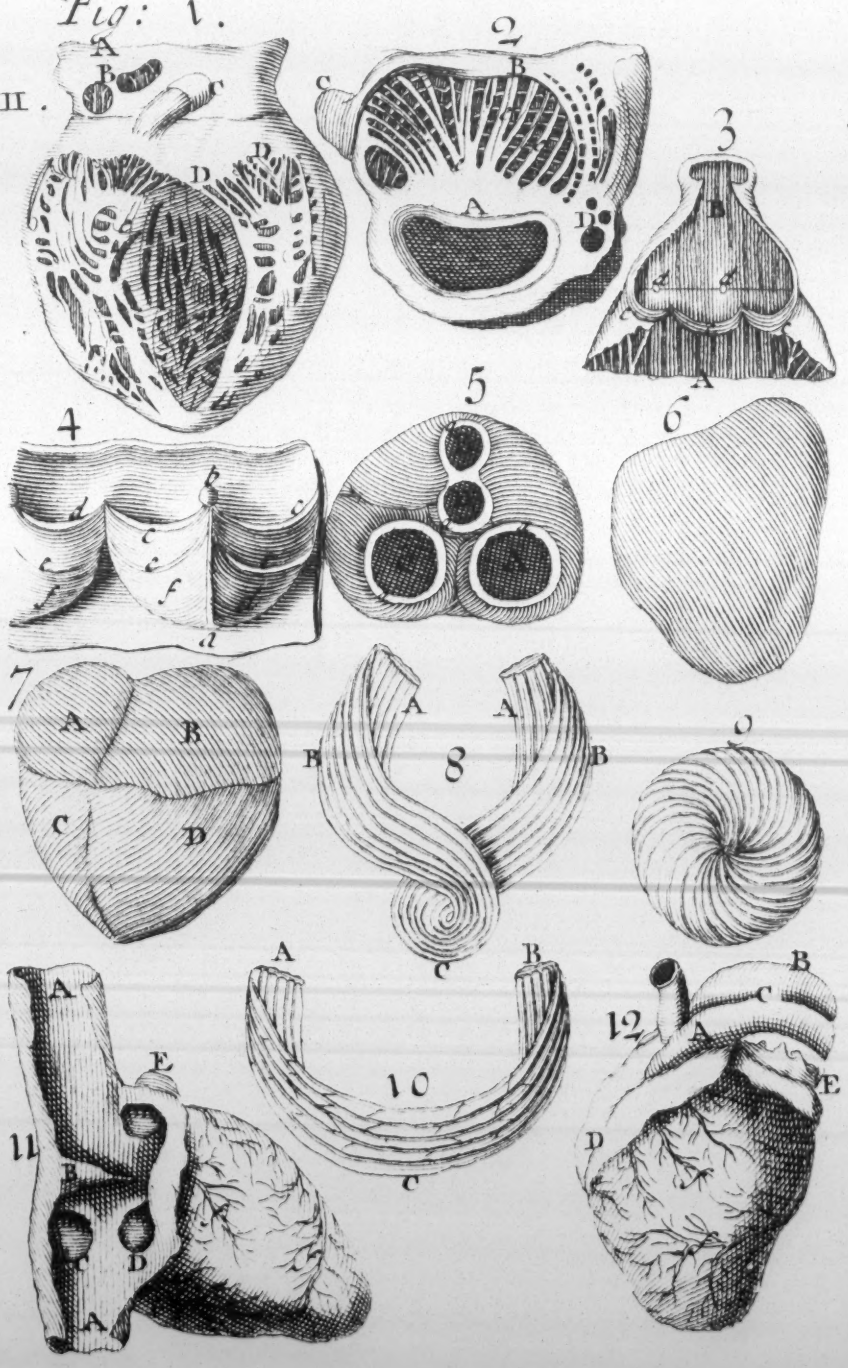
Fig: 1.

The right side of ye Breast open'd.

The Ventricles & Auricles of ye Heart wth ye Foramen ovale &c from Lower.

Fig: 1.

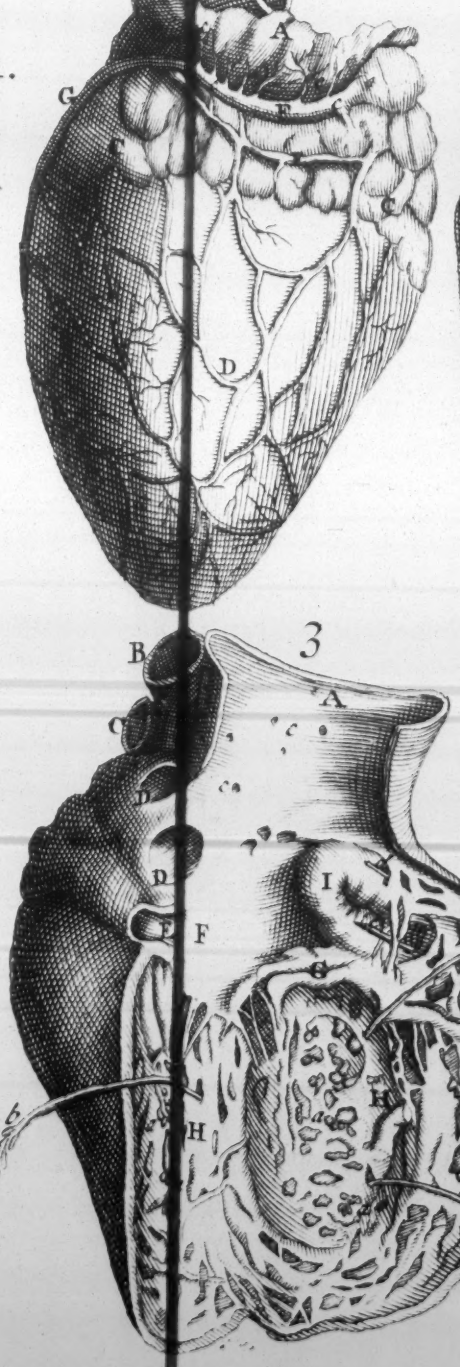
Tab. III.



The Ducts of several Vesse & Auricles of ye Heart discove Vieussen

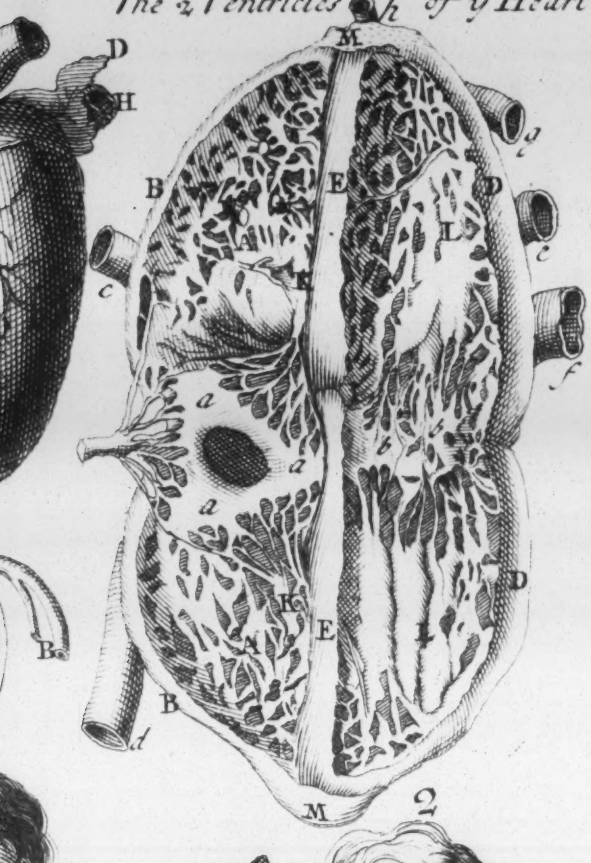
Fig: 1.

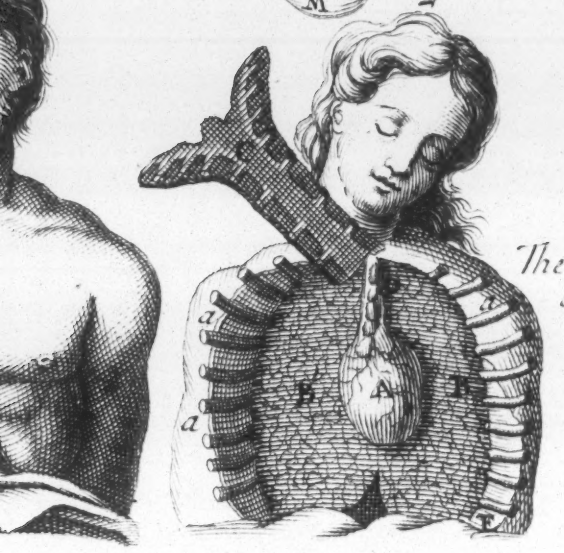
Tab. IV.



of ye Body

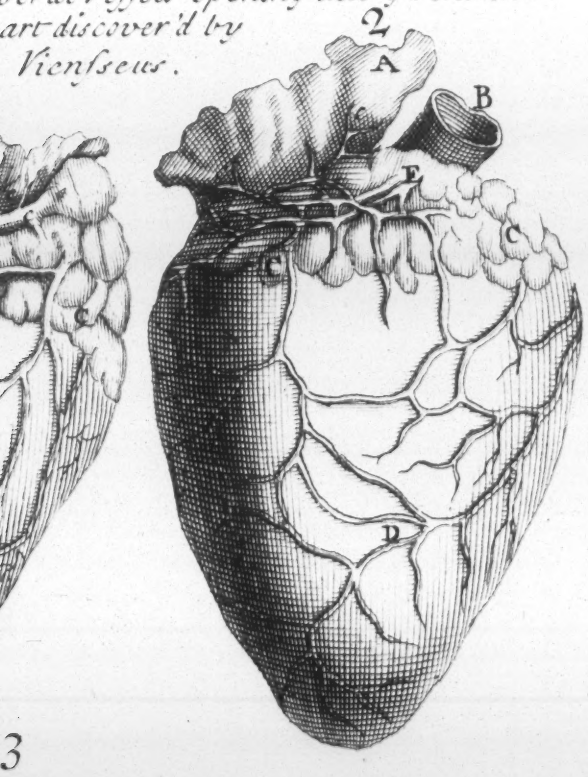
The 2 Ventricles & h of ye Heart cut lengthways





The whole Breast open'd

veral Vessels opening into ye Ventricles art discover'd by Vieussens.



Tab. V.

The Windpipe, Lungs, & several other parts

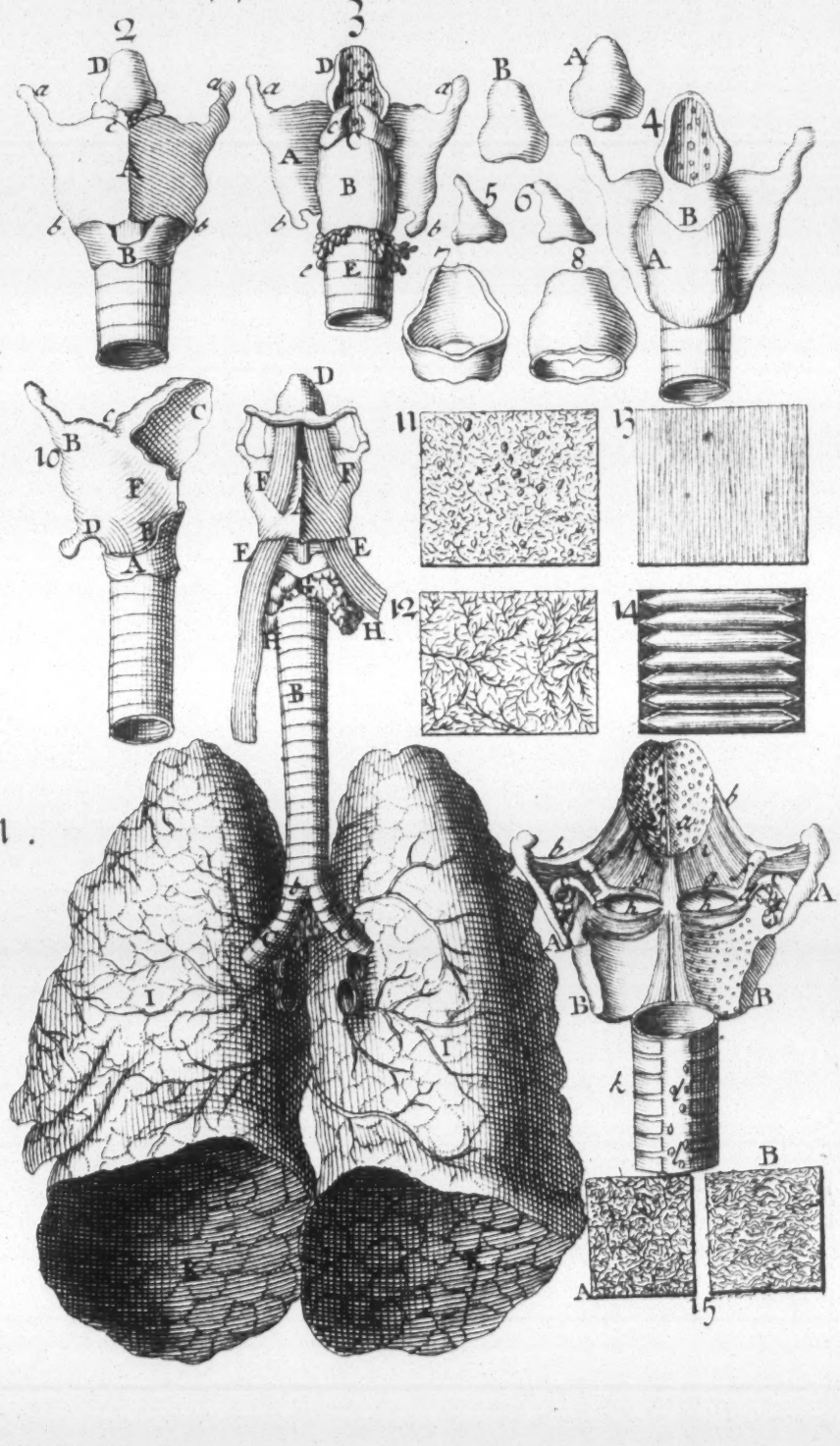


Fig: 1.

Fig. V. *The upper Part of the Diaphragm or Midriff taken from the Body.*

A. The Anterior Muſcle.
B. The Poſterior Muſcle.
C. The Tendinous, commonly the Nervous Part.
D. The *Foramen* or Hole through which the Gullet paſſes.
E. The *Foramen* for the *Vena Cava.*
F, F. The Proceſſes of the Diaphragm, the Right whereof conſiſts of a Triple Tendon.
G, G. The Veins of the Diaphragm.
H. The Arteries.
I. A ſmall Vein and Artery ariſing in the upper Part.
K. Nerves of the Diaphragm from the Arms.
L. Others from the Intercoſtal Branch.

TAB. II.

Fig. I. *The Breaſt open'd on the Right Side.*

A. The Lungs in Sight.
B. The *Mediaſtinum* in View.
C. The Diaphragm.
D. Part of the Cavity of the Belly.
a, a. The Ribs caſt back and bar'd.

Fig. II. *The whole Breaſt open'd.*

A. The *Pericardium*, with the Heart clos'd in it, in View.
B. The Lungs.
C. The *Sternum* turn'd up.
D. The Gland *Thymus.*
E. The Membrane call'd the *Pleura.*
a, a. The Ribs as before.

Fig. III. *The Heart taken from the Body, and ſeparated from the Lungs, with the Trunks of the Blood Veſſels joining to it.*

A. The Baſis of the Heart.
B. The Tip.
C. The Right Auricle.
D. The Left.
E. The Upper *Vena Cava.*
F. The Lower.
G. The Pulmonary Artery.
H. The Pulmonary Vein.
I. The *Aorta.*
K. The proper Veſſels of the Heart.

Fig. IV. *The Heart cut through both Ventricles lengthways.*

A, A. The Right Cavity of the Heart.
B, B. The Right Sides.
C, C. The Left Cavity.
D, D. The Left Sides.
E, E. The *Septum* in the Middle.
F. The Orifice of the *Vena Cava.*
G. The Orifice of the Pulmonary Artery.
H. The Orifice of the Pulmonary Vein.
I. The Orifice of the *Aorta.*
K. The ragged Holes in the Right Ventricle.
L. Thoſe in the Left.
M, M. The Tip of the Heart.
N, N. Fleſhy Pieces, that run through the Hollow of the Ventricle, and cut off, leſt they hinder the Expanſion of the Ventricle.
a, a. The Tricuſpide Valves before the Orifice of the *Vena Cava.*
b, b. The Tricuſpide Valves before the Entrance of the *Vena Pulmonaria.*

c. The Trunk of the Upper *Vena Cava.*
d. The Trunk of the Lower.
e. The Trunk of the Pulmonary Artery.
f. That of the Pulmonary Vein.
g. The Deſcending *Aorta* cut ſhort.
h. The Aſcending.

Fig. V. *Part of the Artery that opens into the Cavity of the Heart, that the Semilunar Valves may appear.*

A. Part of the Arterial Trunk.
B. The Coronary Artery of the Heart.
C, C, C. The Semilunar Valves.

TAB. III.

Fig. I. *The Left Ventricle of the Heart laid open. From* Lower.

A. The Pulmonary Vein open'd.
B. The Entrance into the Left Auricle.
C. The *Foramen Ovale* pouring in Blood.
D, D. Two Valves at the Entrance into the Pulmonary Vein, the exterior of which is hurt.
E. The Paſſage to the Orifice of the *Aorta.*
e, e. The fleſhy Protuberances from the Sides of the Ventricle.

Fig. II. *The Left Auricle open'd.*

A. The Baſis of the Auricle, where it is join'd to the Heart.
B. The Tendinous Circle, where it is join'd to the *Vena Cava.*
C. The Upper Part of the Auricle as yet ſhut up.
D. The Coronary Veins.
e, e. The fleſhy Columns, which from the Baſis of the Auricle are ſtretch'd to the Bottom.

Fig. III. *The Beginning of the* Aorta *laid open, that the Valves may appear.*

A. Part of the Left Ventricle open'd.
B. The Trunk of the *Aorta* open'd.
C, C, C. The Three Semilunar Valves unexpanded.
d, d. The Orifices of the Coronary Arteries.

Fig. IV. *Shews the Form and Structure of the Valves in the Arteries according to their natural Size.*

a, b, c. One of the Valves of the Arteries call'd Semilunar laid open.
b. A Knot from the Concourſe of the Fibres.
c, c. Thicker and firmer Fibres ſtretching the Gland out like a Cord.
d, e, f. Another Valve, not entire by reaſon of the Narrowneſs of the Place.
d. A Part wherein the Tract of the Fibres is more conſpicuous.
e, e. The groſſer Fibres.
f. A Part where the Tunick or Coat is not taken off.

Fig. V. *The Baſis of the Heart ſo diſſected, that the Mouths of the Veſſels may appear.*

A. The Orifice of the *Vena Cava.*
B. The Orifice of the Pulmonary Artery.
C. The Orifice of the Pulmonary Vein.
D. The Orifice of the *Aorta.*
a, a. Tendinous Circles in the Entrance of the Orifices.

Fig. VI. *Straight Fibres in the Right Ventricle, lying directly under the exterior Membrane of the Heart.*

Fig. VII. *The Spiral Ducts of the Fibres of the Heart.*

A. The exterior Fibres obliquely deſcending by the Right Side of the Heart, with the Spiral Duct of the Left.
B. The exterior Fibres regularly deſcending by the Left Side.
C, D. The internal Fibres reſpectively tending on each Side to the oppoſite Part, with the Spiral Duct.

Fig. VIII. *The longer Fibres twiſted in the Cone of the Heart.*

A. The internal Fibres.
B. The external Fibres.
C. The ſaid Fibres twiſted in the Cone of the Heart.

Fig. IX. *The Fibres twiſted in the Cone of the Heart, and here expanded.*

Fig. X. *The Fibres ſtretch'd from one external Side to the other, before they reach the Cone.*

A. The Extremity of theſe Fibres on the Right Side.
B. The other Extremity on the Left Side.
C. The Place where the ſaid Fibres are curved, before they touch the Cone of the Heart.

Fig. XI. *and* XII. *Are made to demonſtrate the Paſſage of the Blood in a* Fœtus *by a Lamb's Heart, the* 11th *being laid on the Left Side, that the Right may be obſerv'd; in which appears,*

A, A. The *Vena Cava* laid open.
B. The Angle betwixt the Aſcending and Deſcending *Vena Cava.*
C. The *Foramen Ovale.*
D. The common Orifice of the Coronary and Broachial Vein in Sheep.
E. The Extremity of the Right Auricle.
f, f. The Branches of the Coronary Vein and Artery of the Heart.

Fig. XII. *The Heart laid on the Right Side, that the Left may appear.*

A. The Pulmonary Artery.
B. The Deſcending *Aorta.*
C. The ſhort Arterial Duct carrying the Blood from the Beginning of the Pulmonary Artery into the Deſcending *Aorta.*
D. The Fat of the Heart.
E. The Left Auricle.
f, f. The Branches of the Coronary Vein and Artery.

TAB. IV.

Several Ducts opening into the Ventricle and Auricle of the Heart, diſcover'd by Vieuſſens ; *and the Number of Veins diſpers'd through the Auricles, denied by the ſame Author : To which ſome Things are added which relate to the Lungs and Windpipe.*

Fig. I. *Repreſents the Heart ſo plac'd, that you may ſee the Left Side of it, and the Veins diſtributed through the Left Auricle.*

A. The Left Auricle of the Heart.
B. The Pulmonary Artery cut off.
C, C. The Fat diſtributed along the Baſis.
D. The Veſſels of the Subſtance of the Heart.
E. The Coronary Artery running backwards.
F, G. The Coronary Vein.
c, c, c. Branches of the Coronary Vein running thro' the Subſtance of the Auricle.

Fig. II. *The Heart ſo placed as to ſhow the Right external Side.*

A. The Right Auricle.
B. The *Aorta* cut.
C, C. The Fat.
D. The Right Branch of the Coronary Vein.
E. The Coronary Artery.
c, c. Little Branches from the Subſtance of the Heart, that open into the Cavity of the Auricle.

Fig. III. *Opening the Right Ventricle and Auricle, with the Superior* Vena Cava, *the late diſcover'd Paſſages may be ſeen.*

A. The Superior *Vena Cava* open'd.
B. The *Aorta* cut off.
C. The Orifice of the *Vena Cava* turned towards the hind Part.
D. The *Cicatrix* or Skinning of the *Foramen Ovale.*
E. The great Inoſculation of the Coronary Vein.
F. One of the Mitral Valves expanded.
G. The other clos'd.
H, H. The Right Ventricle open'd and ſpread.
I. The Bottom of the Right Auricle.
a, a, a. The Orifices opening into the Cavity of the Ventricle, from which ſome ſmall Drops of the injected Liquor break out.
b, b, b. Streams ariſing plentifully from the ſame Liquor by other Orifices.
c, c. The Mouths of the Coronary Branches apparent in the *Vena Cava.*
d. A little Stick thruſt into the Coronary Branch.
e. A larger put into a much larger Trunk of the ſame Denomination.

Fig. IV. *Part of the Lungs dried, in which the larger* Foramina *appear to the Mouths of the Veſſels, and the other Veſicular Cavities.*

Fig.

Fig. V. *Shows the Broachial Glands of the Windpipe, with its Branches and Subdiviſions.*

A. The Trunk of the Windpipe cut off.
B, B. The greater Branches thereof.
C, C, C. The Glands of the Trunks, and their Subdiviſions.

TAB. V.

Shows the Trachea, *Lungs, and other adjacent Parts.*

Fig. I. *The Lungs, with the Windpipe, taken from the Body.*

A, B. The Windpipe.
A. The Head.
B. The Trunk.
C, C. The two largeſt Branches.
D. The *Epiglottis.*
E, E. The Sterno-thyroide Muſcles, call'd *Sterno Scrutarii.*
F, F. The Hyo-thyroide Muſcles, call'd *Bicornu Scrutarii.*
G. The Crico-thyroide Muſcles, or *Annulo Scrutarii.*
H, H. The Thyroide Gland.
I, I. The larget Lobes of the Lungs.
K, K. The inferior Parts of the Lungs.
L, L. The Fiſſures which divide the large Lobes.
a. A Gland betwixt the Branches of the *Aſpera Arteria, C, C.*
b, b. Glands adjacent to the Side of the *Aſpera Arteria.*
c, c. The larger Branches of the Pulmonary Artery.
d, d. The larger Branches of the Pulmonary Vein.
e. The *Os Hyoides* extended.
f, f. The Ligament betwixt the *Os Hyoides* and Thyroide Cartilage.

Fig. II. *The Muſcles being remov'd, the Cartilages of the* Larynx *appear on the fore Part, and* Fig. *the 3d on the hind Part.*

A. The Thyroide Cartilage.
B. The Cricoide Cartilage.
D. The *Epiglottis.*
a, a. Two ſuperior Proceſſes of the Thyroide Cartilage.
b, b. Two of its inferior Proceſſes.
c. The Fiſſure in the Thyroide Cartilage.
d. The Glands lying on the Back of the *Epiglottis.*

Fig. III.

C. The Space where the Innominate Gland lies.
r. The two Arytænoide Cartilages.
d. The Orifices of the Ducts of the Gland *d. Fig. II.*
e. The Glands of the *Aſpera Arteria.*

Fig. IV. *The convex Side of the* Epiglottis *ſeparated from the reſt.*

A. The *Epiglottis,* with the globous Part adhering.
B. The *Epiglottis* without it.

Fig.

Fig. V. *and* VI. *The Arytænoide Cartilages.*

Fig. VII. *The fore Face of the Cricoide Cartilage.*

Fig. VIII. *The back Part of the ſame.*

Fig. IX. *The Muſcles of the* Larynx *in the poſterior Part.*

A, A. The Crico-arytænoide Muſcles, or *Annulo Gutturales.*

B. The common Arytænoide Muſcles.

Fig. X. *The Side Muſcles of the* Larynx.

A. The Cricoide or Annular Cartilage.
B. The Thyroide Cartilage.
C. The *Epiglottis.*
c. Its back Ligament.
D. The *Muſculus Crico-thyroideus Anticus.*
E. The *Muſculus Crico-thyroideus Lateralis.*
F. The *Muſculus Thyro-arytænoideus.*

Fig. XI. XII. XIII. *and* XIV. *Regard the Glandulous and Membranous Coats of the* Aſpera Arteria, *whereof all but the 13th are from* Willis.

Fig. XV. *The poſterior Head of the* Larynx *cut in the Middle lengthways and expanded, that the interior Parts may appear.*

A. The *Lamella* of the internal Tunicle binding the Lungs with its *Areola.* From *Willis.*
B. The external *Lamella* of the ſame.
A, A. The Thyroide Cartilage.
B, B. The Annular or Cricoide Cartilage.
C, C. Two Arytænoide Cartilages.
E. *Epiglottis.*
a, a. The Excretory Ducts of the Glands lying upon it.
b, b. The Lateral Ligament of the *Epiglottis.*
c. The Arytænoide Gland cover'd with the Ligament.
d. The ſame laid bare.
e, e. The Innominate Gland, filling the *Interſtitium* betwixt the two Glands.
f, f. The ſtrong Ligaments with which the Cartilages of the *Scutalis* and *Guttalis* are join'd together.
g, g. The ſuperior Ligaments with which the ſaid Cartilages are join'd amongſt themſelves, and with the *Epiglottis.*
h, h. Large Sinuſes betwixt the ſaid Ligaments.
i, i. Fibres from the ſuperior Ligament into the *Epiglottis.*
k. Part of the Trunk of the *Aſpera Arteria.*
l, l. Glands inhering in the Membranous Part of the Trunk.

All

An Account of King William's *Conſtitution, and State of Health, from his Infancy, but particularly from* 1688. *Chiefly taken from Dr.* Bidloo's *Relation of his laſt Sickneſs, and Death. Printed in* Holland, *and Dedicated to the Prince of* Friſland. *To which are added, Several Letters from Eminent Phyſicians on that Subject.*

THE fatal Eighth of *March* being now come, which ended the Life of the Glorious King *William*, it is neceſſary, in order to have a full View of the State of His Majeſty's Health, to look as far back as 1688.

Dr. *Bidloo* being then Phyſick-Lecturer at the *Hague*, he had an Opportunity to know that Prince's Conſtitution, and to hear from himſelf many Particulars as to the State of his Body, and the Nature of his Indiſpoſitions, from his Youth upwards. About this Time the Doctor was advanced to be One of His Majeſty's Phyſicians, and ſerv'd him in that Station Fourteen Years, ſometimes alone, and at other times in Conſult with His Majeſty's *Engliſh* and other *Dutch* Phyſicians, particularly Dr. *Hutton*, Dr. *Harris*, Dr. *Lawrence*, and Dr. *Sypeſtein*, Burgomaſter of *Utrecht*.

In 1697, His Majeſty being at his Palace of *Loo*, ſhew'd Dr. *Bidloo* his Feet, the Left being ſwell'd above the Ankle, and the Right up to the Heel. After ſeveral Queſtions by His Majeſty, the Doctor acquainted him, That if great Care were not taken to apply good Medicines, and likewiſe of His Majeſty's Way of Living and Diet, the Diſtemper would increaſe. Upon this His Majeſty anſwer'd: 'I have obſerv'd this Swelling 'theſe Two Years, but of late 'tis grown 'worſe. Every one ſays, that I injure my 'ſelf by much Hunting; but if I don't 'follow violent Exerciſes, I have not the 'Freedom of Reſpiration, and my Feet ſwell 'more than at other times. Faint Exerciſe 'does not avail me; but you'll ſee, that as 'ſoon as I have hunted hard, this Swelling 'will abate.

Upon this the Doctor order'd Warm Bags, with,

Herb. Menth. M. ij.
Flor. Roſar. M. j.
Lavend. M. ß.
Sem. Cumin. ℥ ij. *contund. f. cum Addit. S. p.*
Far. Tritic. Pulvil.

To be applied to His Majeſty's Feet, which abated the Swelling; but His Majeſty catching cold again, ſaid, *This Application breaks my Reſt. I had rather have ſwell'd Legs, than not ſleep.*

The Doctor adviſ'd His Majeſty to go to Bed betimes, and to be regular in his Diet, *&c.* To which His Majeſty replied, 'At this Rate I muſt always have a Doctor 'to attend me: I'll do what I have a Mind 'to: I am very well acquainted with my 'own Conſtitution. All the Doctors would 'have me take hot Things, and lead a ſe-'dentary Life; but they are miſtaken: Every 'one that is above Thirty or Forty Years of 'Age ought to be his own Phyſician. From

'my Infancy I have lov'd Shooting, and 'have often been wet to the Knees; after 'which I always fed heartily, without ſhift-'ing my ſelf, and being tired, ſlept in a 'Chair. I believe, the Cold I then catch'd 'occaſion'd the Swelling of my Feet; but 'ſo long as I eat well, I fancy 'twill do me 'no great Hurt. His Majeſty, ſays the Doctor, had a great Averſion to Medicines, and to Phyſicians that made bulky Receipts, though he always eſteem'd the Faculty.

The Doctor ſays, that the following Preſcriptions by other Phyſicians were put into his Hands, but that he will not offer to give his own Judgment as to the Particulars, being willing to ſpare other Men's Honour, and to ſubmit the whole to the Learned Phyſicians of *Holland.*

In 1700, *June* 2.

℞ *Pulv. e Chel. comp.* ʒ j. In 3 Doſes.

℞ *Aq. Lact. Alexit.* ℥ iiij.
Ceraſ. nig. ℥ iij.
Epidem, ℥ ii. *ſs.*
Theriac. ʒ j.
Marg. ppt. ℥ ij.
Sacc. Per.
M.

℞ *Aq. Lact. Alexit.* ℔ ij. *ſs.*
By Dr. *Ratcliff.*

June 10.

℞ *Fol. Heder. Terr. M.* vj.
Summit. Abiet.
Ling. Cerv. an. M. iiij.
Sem. Dauc. Sylv. ℥ iiij.
M. P. Saccul.
Qui ſuſpend. in vj *Congiis Cereviſ. non lupulat.*
By the Doctors *Ratcliff* and *Lawrence.*

June 26.

℞ *Pillul. Stomach. c Gum.* ℈ j.
Sal. Volat. Succ. Gr. iij.
C. S. ♃. Syr. Viol. F. P. N° 4.
Sumend. Horâ Somni.

℞ *Tinct. Sal. Tart.* ʒ ij.
Capiat Gutt. xx. *quotidie.*
Millep. contuſ. & expreſſ.
N° xxx. *capiat in Hauſt.*
Cerev. Medicat. quotidie
Horâ Sextâ Pomeridianâ.
By Dr. *Ratcliff,* Sir *Rich. Blackmore,* and Dr. *Lawrence.*

June 28.

℞ *Pill. Stomach. c. Gumm.* Gr. xxvj.
Scamm. Sulph. pp. Gr. ij.
F. P. N° iiij. *Sum. Horâ Som.*
By Sir *Rich. Blackmore,* and the Doctors *Ratcliff* and *Lawrence.*

July 30, N. S.

℞ *Aq. Senelor. comp.*
Raphan. comp.
Hord. A. ℔ j.
M.
Capiat Cochlear. iiij. *omni man.*
p. 6. Septim.
The Doctors *Ratcliff, Blackmore, Millington, Lawrence, Burgem, Sypeſtein,* and *G. Bidloo.*

November 6.

℞ *Aq. Flor. Samb.* ℔ ij. *ſs.*
In qua c. infund.
Flor. Sambuci, M. ij.
Per Horam; in colatur.
Solv. Sapon. Caſtil. ʒ j.
Deinde adde,
Ol. Tart. per Diliq. ʒ iij.
Miſceant. diligenter, & F. Lotio; fo-veant. Part. affect. mane & veſperi.

℞ *Pulv. e Chel. comp.* ʒ j. *ſs.*
Marg. pp. ʒ ij.
Aq. Lact. Alexit. ℔ *ſs.*
Cinam. tenuior. ℥ ij.
Sacch. opt. ʒ iij.
M. Sum Cochlear. iij.
Sir *Thomas Millington,* and the Doctors *Hutton* and *Harris.*

Decemb. 27.

℞ *Spec. de Althea*, ʒ j. ß.
Sal. Prunell. ʒ ij.
Sacch. alb. ʒ iiij.
Mucilag. Gumm. Tragac. ql. F. Tabell. comed. unam frequenter.

℞ *Cremor. Tart.* ʒ ß.
Sumat bis vel ter in Die.
Parentur N. xx.

℞ *Decoct. Hord. depur.* ℔ iij.
Affund. Cal. Rad. Eryng.
Cond. concis. ʒ iij.
Sal. Prunell. ʒ j.
Sp. Ceras. nigr. ʒ j.
F. Ptisana; sumat ad placit.
The Doctors *Millington, Blackmore* and *Lawrence.*

December 31.

Sumat omni mane per Septiman. Elix. Vitriol Mynsicht. Gutt. x. *in Aq. Spadan.* ʒ vj. *& superbibat ejusd. Aq.* ʒ x. *intra Spatium Horæ.*

Repet. Gutt. quotidie Horâ Quintâ Pomerid. in haustaq; Spad. aut cujusvis alt. Veh. idon.
The Doctors *Millington, Blackmore* and *Lawrence.*

1701. *Jan.* 4.

℞ *Ext. Gentian. Centaur. m. a. Gr.* xxv.
Tart. Vitriol. Sal. Absynth. a. ℈ j.
Sal. Mart. ℈ ß.
Syr. Balsam. qs. m. F. P.
E sing. ℈ j *N°* iiij.
Sumat iiij. *quotidie Horâ Pom.*
Persist. in Usû Elix. Vitr. P. script. in Aq. Spadan. omni mane.
The Doctors *Millington, Lawrence* and *Blackmore.*

Jan. 15.

℞ *Sal. Cathart. amar.* ʒ j. *Sumat primo mane in Decoct. Pulli.*

Persistat in Usû Aq. Spadan. & Pillul. P. script.
The Doctors *Millington, Lawrence* and *Blackmore.*

Jan. 23.

℞ *Salis Absynth. Ocul.* 69. *pp. Tart. Vitriol. a. Gr.* viij.
Extract. Gentian liq. qs.
Chalyb. c. Sulph. pp. Gr. iij
M. F. P. mediocris mag.
Sumat omni mane pro Dosi unam; & superbibat Aq. Spadan. ʒ xij.
Repetatur; quotidie Horâ Quintâ Pomer. superbib. ejusd. Aq. ʒ iiij. *m.*
The Doctors *Millington, Lawrence* and *Blackmore.*

Jan. 31.

℞ *Mill. vivent. contus. N* 60. *affund. Aq. Spadan. Cochlear* iiij.
F. express. fort. sum. Cochlear. ij. *bis in Die.*
Omni mane sumatur Elix. Vitriol. Mynsicht. Gut. xv. *in Haustu Aq. Spadanæ, cujus quotidie sum.* ℔ iij.

℞ *Chalyb. c. Sulph. pp. Gr.* xij.
Tart. Vitriolat. Gr. vj.
Sp. Terebinth. Gutt. vj.
Ext. Gentian. liq. qs. m.
Fiant. Pillul. pp. 2 *Dosib.*
Sumat. una mane, altera Horâ Sextâ Pomerid. superbib. Haust. Aq. Spadan.
The Doctors *Millington, Blackmore* and *Lawrence.*

February 3.

℞ *Sal. Vol. Succ. Gr.* iv.
Chalyb. c. Sulph. pp. Gr. v.
Sal. Absynth. Gr. viij.
Ext. Gent. qs. F. P. p. Dos.
Capiat omni mane, & Horâ Sextâ Pomer. & tunc Temporis sum. Bolus seq.

℞ *Millep. vivent. mund. N°* xx. *contus. add. Pulv. Millep. pp. qs. F. Bolus.*

February 15.

℞ *Ung. Popul. alb. Camph. a.* ʒ vj.
Balſ. Sulph. ʒ iij. *Suber. comb.* ʒ ij.
M. F. Liniment. P. Hæmorr.
Cras mane renovet. Uſus Pillul. ex Millep. & Chalyb. P. ſcript.
Omni mane & Horâ 6 Pomerid. ſuperb. Aq. Spadan. ʒ vj.

February 23.

℞ *Flor. Samb. Meliſſ. Camom. a. M. ß.*
Fol. Altheæ, Malv. Viol. a. M. j.
Sem. Lin. Fœnugr. a. ʒ ß.
Coq. in S. q. Lact. Vacc. ad ℔ iij. *pro Balneo vaporoſo.*

℞ *Rhei Elect. Torr.* ℈ j.
Confect. Fracaſt. ℈ ß.
Syr. Cydonior. qſ.
M. F. Bolus, Horâ Somni ſumend. hac Nocte, ſi Diarrhœa duraverit.

February 27.

℞ *Flor. Sulph. Gr.* xxiv.
Syr. Balſ. qſ. m. F. P. ſumend. Horâ 6 Pomer. hodie, & deinceps omni mane veſperi P. Triduum.

March 9.

℞ *Lumbric. terreſt. pp.*
Millep. pp.
Flor. Sambuc. a. ʒ ß.
Ext. Gent. liquid. qſ.
M. F. P. N° iiij.
E ſingulis ℈ j. *ſumant.*
N° 5. quotidie Horâ 6 Pom.
Omni mane exhibeant. Elix. Vitriol. Mynſycht. Gt. xx. *in Hauſt. Aq. Hord. aut quovis Vehiculo idon.*

March 30.

℞ *Ext. Rhabarb.* ℈ j.
Reſin. Jalapp. Gr. iv.
Sal. Tart. Gr. iv.
Syr. Balſ. qſ.
M. F. Pil. N° iv. *ſum. mane.*

April 7.

℞ *Ext. Gent. Centaur. m. Sal. Abſynth. Lumbric. terr. a.* ʒ ß.
Ext. Gentian. liq. qſ.
M. F. P. mediocr. ſum. iiij. *quotidie Horâ 6 Pomer. & ſuperb. Aq. Raphan. & Hord. pſ. Cochlear.* iiij.
Continuet. Uſus Pillul. Chalyb. omni mane, & Aq. prædict.

April 21.

℞ *Cort. Rad. Prun. Sylv.* ʒ iij.
Rad. Biſtort. Sem. Cochlear. a. ʒ ij.
Alumin. ℈ ij. *Maſtic.* ʒ ij.
Coq. in Aq. Font. qſ. ad ℔ j.
Colat. add. Mell. Roſ. ʒ ij.
M. F. Lotio, qua colluat Os frequenter.

April 21.

R. *Decoct. Hord.* ℔ ij. *ſup. affund.*
Rad. Eryng. cond. ʒ j. ß.
Colat. Sit pro Potu ordinario.

R. *Ext. Gent.* ℈ ß.
Pulv. Ari comp. Gr. vij.
Chalyb. cum Sulph. pp. Gr. v.
Ext. Gent. liquid. qſ. m. F. P. pro Doſi ſumend. omni mane, & Horâ 5 Pom. ſuperbibend. Aq. Antiſcorb. pſ.

All by the Three Doctors above-mentioned.

April 24.

R. *Ext. Rhei,* ℈ j.
Reſ. Jalapp. Gr. vj.
Sal. Tart. Gr. iv.
Syr. Balſ. ql. F. P. N° iv. *cras mane.*

R. *Ext. Gentian. Centaur. m. a. Gr.* iv.
Chalyb. c. Sulph. pp. Gr. iv.
Animæ Hepat. Gr. iij.

C. s. q. Ext. Gent. liq. F. Pil. Nº iiij. *sum. omni mane & vesperi, superbib. Aq. Lumbric.* ℥ ß. *in Aq. Hord.* ℥ ij.

The Doctors *Millington, Blackmore, Lawrence* and *Browne.*

R. *Sumit. Abiet. M.* iij.
Rad. Eryng. Mar. ℥ iiij.
Coq. Loco Lupulor. in Cerev. tenuis Congiis iiij. *finita Ferment. suspende in Doliolo.*
Fol. Hederæ terr. M. vj.
Sem. Dauc. Sylv. ℥ iv.
Sit pro Potu ordinario.
Continuet. Usus Pillular. noviss. præscript. purgant. & non purg.

R. *Sumit. Absynt. vulg. Rosmar. Abrotan. Fol. Samb. a. M.* vj.
Flor. Chamæm. Salv. Anth. a. M. iiij.
Bacc. jun. p. ℥ iiij.
Coq. in s. q. Aq. Calcis ad Cong. x.

R. *Cort. Winteran. Gr.* vj.
Animæ Hepat. Gr. viij.
Ext. Absynth. Helen. a. Gr. xv.
M. F. P. Nº iiij. *sum. omni mane, & Horâ 6 Pomer. superbibend. Aq. Raph. comp.* ℥ ß.
Aq. Hord. ℥ ij.
Repetant. Pillul. purg. noviss. pšc. add. Res. Jalapp. Gr. ij.

May 22.

R. *Conf. Absynth. Rom.* ℥ j.
Anim. Hepat. ℈ ß.
Tart. Vitr. Gr. v.
Syr. e Cond. Nuc. Mosc. q. s. m. F. Bolus.
Sumend. omni mane & vesper. superbib. Aq. Absynt. comp. ℥ iij. *in* ℥ j. ß. *Aq. Lact. Alexit.*

May 29.

R. *Succi Cochlear. hortens. Nasturt. Aq.*
Becabung. a. ℥ iij.
Aurant. q. s. ad depur.
Vini Rhen. ℥ iiij.
Depurentur p. subsident. Liquor. Colat. add. Aq. Absynt. mag. comp. ℥ ij.
Sacch. q. s.
Sumant. Cochlearia iiij. *quotidie: Continuetur Usus Boli P. script.*

These by the Four Doctors above-mentioned.

June 19.

Continuetur Usus Succor. P. script. semel in Die, addendo Tinct. Mart. Mynsycht. Gutt. xx: *singulis Dosibus, & semel etiam in Die.*
Exhibeant. ℥ iiij. *Tinctur. Antiscorb. cum, vel sine Absynth. vulgar. addend. eand. Quantit. Tinct. Mart. pp.*

Over and above these, two Potions were appointed for His Majesty, whose Legs were now view'd twice a Day for two Days together. Dr. *Lawrence* came to see him, and a little after Dr. *Sypestein*, Burgomaster of *Utrecht*. His Majesty awaking, they were call'd, and had his present State of Health deliver'd them in Writing, after His Majesty had read it, as follows:

'Forasmuch as such Physicians as have 'had the Opportunity of a long Ac- 'quaintance with a Patient's Constitution, 'are most capable to serve him in the Way 'of Cure, especially when the Distemper is 'confirm'd by Process of Time; 'Tis pre- 'sum'd, the following Account of His Ma- 'jesty's Constitution, and of the Medicines 'exhibited in this Country in the Compass 'of the last Year, (before which there was 'but little prescrib'd) may be of Use to 'those who are call'd to consult upon His 'Majesty's Case, and are unacquainted with 'his Constitution:

'His Majesty has been troubled from his 'Infancy with a Weakness in his Lungs, 'and a continual Cough, and frequently 'with Asthmatick Oppressions, excepting 'within these ten or twelve Years last past, 'that the Asthmatick Paroxysms have in a 'Manner quite left him, though his Ex- 'pectoration is much more considerable than 'formerly. Since that Time, His Majesty 'has been indifferent healthy, without com- 'plaining of Head-aches, Disorders of the

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'Stomach, the Stone, or the like; and 'has all along had a ſtrong and regular 'Pulſe. In like Manner, he always eat 'well, and had a good Digeſtion. He al-'ways ſlept well, abating for the Time of 'an extraordinary Oppreſſion in his Breaſt. 'He ſtill enjoy'd the Benefit of an open Bo-'dy, to the Rate of two or three Stools in 'Twenty four Hours, and was never trou-'bled with a Looſeneſs, and but very ſel-'dom with Coſtiveneſs. He was never ſub-'ject to acute or violent Diſtempers, unleſs 'it was when he had the Small-Pox, which 'was very favourable: Neither was he ever 'ſeiz'd with Intermitting Fevers, till with-'in theſe five or ſix Years; That in the un-'ſeaſonable Seaſon of the Year, he has had '(now and then) one or two gentle Fits of 'an Ague, with a Shivering, and a Nau-'ſeouſneſs for ſome Days before and after. 'In his Diet he always obſerv'd the ſame 'Courſe. He ſtill eat moſt of the firſt Ser-'vice, *viz.* Soup made of Pulſe, Pot-Herbs, 'and ſtew'd Meat: Of the ſecond Service 'he uſed to eat but little; but he eat a 'great deal of Fruit, though never or very 'ſeldom between Meals. Confections or 'Sweetmeats, whether dry or moiſt, he ne-'ver or ſeldom made uſe of. For five or ſix 'Months of the Year, both his Wine and 'his Beer were always cool'd in Ice; and 'the laſt was always bottled. His Breakfaſt 'was only a Diſh of Chocolate, without 'any Water in it, unleſs when he was 'Coſtive. He has been wonderfully inde-'fatigable in all his Exerciſes, whether in 'Hunting, or in the Field of Battle. He 'was never much inclin'd to Sweating; for 'in his moſt violent Exerciſes, and even in 'the hotteſt Time of the Summer, he never 'us'd to be incommoded with Sweat or 'Thirſt, eſpecially for theſe laſt twenty 'Years. Conſidering the Tenderneſs of his 'Conſtitution, he did not uſe to be much 'affected with the Senſe of Cold, till with-'in theſe four or five Winters laſt paſt.

Dated June 28. 1701.

Such were the Medicines that His Majeſty uſed before his Departure for *Holland* in the Summer, 1701. Much about that Time his Phyſicians gave their Opinions in Writing about the Nature of his Diſeaſe, and the proper Remedies. Dr. *Liſter*'s Opinion was to this Purpoſe; Dated at *Hampton-Court*, *May* 6. 1701. being the Reſult of a Conference with Dr. *Lawrence*.

His Majeſty's Diſtemper is neither a true Scurvy nor a Dropſy. The Looſeneſs of his Teeth, and the Diſorder of his Gums, give ſome Suſpicion of the Scurvy; but then the other Symptoms of Scorbutick Caſes are abſent; for he has no Pains, Spots, or diſcoloured Places in his Limbs, or any other Part, no Scorbutick Signs in his Water; he is not ſubject to acute or ſudden Diſorders, to the Intermiſſion of the Pulſe, or to reſtleſs Sleeping. The Swelling of his Legs and Thighs ſpeaks the gradual Advances of an *Aſcites*; but we muſt conſider, that he ſleeps, eats and drinks as before, that his Expectoration is much the ſame, that his Water is not high colour'd, that the upper Region of his Body is not render'd leaner by the Swelling of his Legs, that his Complexion is not alter'd, that his Eyes are vigorous, his Face and Hands white and ruddy, his Pulſe is ſtrong and equal, and that he is never Feveriſh. The ſmall Succeſs of the Steel and Chalybeate Waters that His Majeſty uſed, is a farther Proof that his Caſe is not properly Scorbutick; and though 'tis alledg'd, that he has took 'em in too ſmall a Quantity, yet 'tis certain, that ſuch Things as produce no good Effect in a ſmall Quantity, will never compaſs the Cure in a greater. When he firſt commenc'd the Uſe of Spaw Waters and Chalybeate Pills, the Swelling was only about the Ankles; but upon the Uſe of them, it roſe in a few Weeks half Way up to his Thigh. If it be alledg'd, that theſe Remedies abated his Thirſt, and ſtrengthen'd his Appetite; I anſwer, That his Thirſt was occaſioned by the Uſe of the hot Antiſcorbutick Waters, and that his Appetite might have been ſtrengthen'd by nouriſhing Medicines. The Purges that His Majeſty took had no Effect upon the Swelling, as being rather aſtringent and heating, than proper *Hydragoga*. As for His Majeſty's Cough, he has had it for ſeveral Years, and both his preſent and future Health requires the Continuation of the Evacuation made that Way. The moſt dangerous Symptom is the Swelling of his Legs and Thighs, which, conſidering his Weakneſs, his continual Fatigue, and

and the Neceſſity of Expectoration, is not to be cur'd by violent and weakening Medicines, ſuch as moſt Purgatives and ſtrong Diureticks are; beſides that he goes naturally to Stool thrice a Day, which is ſufficient to carry off the ſuperfluous Crudities, and at the ſame Time cautions us to take Care of throwing him into a mortal Looſeneſs. Strong Diureticks are acrimonious and corroſive, and occaſion both Thirſt (the worſt of all the Symptoms in this Caſe) and an Obſtruction of Flegm, by Vertue of the Diverſion. His Majeſty ought to continue the Diet that he has been long accuſtom'd to; and pray God continue his good Appetite. In ſuch Caſes I have ſeen wonderful Effects from the moderate Uſe of ripe Fruit, ſuch as Pippins, *Seville* Oranges, *Malaga* or *Genoa* Citrons, Strawberries, Cherries and Currants, *&c.* for they promote the inſenſible Tranſpiration, and above all, fortify the Digeſtion of the Stomach. I would adviſe His Majeſty to walk on Foot as much as he can, and that only in the Morning, and in the Afternoon before Sun-ſet. As ſoon as he comes within Doors, I would have His Majeſty to throw himſelf upon a Bed for half an Hour or an Hour before he eats, and cover up his Legs; for the Legs being warm'd all over by Exerciſe, the obſtructed Blood will have a freer Circulation in that Poſture. To leſſen the Swelling in his Legs, let His Majeſty take an Ounce of the *Tinctura Sacra* thrice a Week; and every other Day, *Hiera Picra*, an Ounce; Cochineel, a Dram, well powder'd and ſifted; a Pint of old *Hochgemer* Wine, and a Pint of *Palm* Wine, mix'd together cold, and ſtrain'd after ſtanding Forty eight Hours. If the Swelling be obſtinate, purge him once a Month with Pills of *Confectio Hiera*, *Extractum Rudii*, and the Juice of Liquorice diſſolv'd in Roſe-Water, ℈ j. *M. F. Pillul. N.* viij. *inaurentur*; and give but one Pill for a Doſe. On thoſe Days in which His Majeſty does not uſe the *Tinctura Sacra*, I recommend the Uſe of the following Electuary, as being very proper for redreſſing the Conſtitution of the Body. Take, of the Conſerve of Hips, three Ounces; Cochineel, finely prepared and ſifted, a Dram; Spirit of *Vitriol*, a Scruple; White Sugar-Candy, an Ounce; Spirituous Water of Mead-ſweet-Flowers, half a Dram; mix. If His Majeſty nauſeates the Electuary, he may take in the Room of it Morning and Evening a Glaſs full of ſimple diſtilled Worm-Seed or Rue Water, with a little Sugar; or of the Infuſion of Worm-Seed or Rue in Spring-Water, with a little *Rhenish* Wine. As for the Coldneſs of His Majeſty's Legs, I hope it may be remedy'd by Exerciſe, or by a gentle Friction from the Toes upwards: Or let the Soles of his Feet be rubbed gently Morning and Evening with a ſoft Napkin, dipped in *Hungary* Water.

I preſcribe theſe Things to put His Majeſty's Phyſicians in Mind of certain Medicines which I have practiſed ſucceſsfully Forty Years in ſuch Caſes, but not to dictate to them. If they like this, I deſire they would ſign it as their own Preſcription as well as mine; for I ſhall have Satisfaction enough, if it may reſtore His Majeſty's Health, for the common Good of *Europe*, which God ſpeedily grant for all our Comforts.

Dr. *Millington*, *Blackmore*, *Lawrence* and *Browne*, gave a joint Conſultation, the Purport of which is as follows:

"Tis our Opinion, that the Swelling of His Majeſty's Legs is a peculiar (not univerſal) Scorbutick *Anaſarca*, *i. e.* a ſoft pale Swelling, that retains Pits after the being preſſed with one's Finger. We take it to be Scorbutick, by reaſon that the Coldneſs of the Swelling ſpeaks a diſpirited and depauperated Blood, that his Gums are diſorder'd, and his Teeth looſe, that his Reſpiration is difficult, and that a Laſſitude and Indiſpoſition for Motion affects him. This Swelling ſeems to derive its firſt Original, partly from His Majeſty's ſitting at one Time above Forty Hours on Horſeback in his Boots, which weaken'd the Spring of the fleſhy Parts of his Legs; and partly from the weak Diſpoſition of his Blood, which is over-run with crude and watery Humours. We attribute this Depravation of his Blood to a Cough above Thirty Years Standing, which, by a copious Expectoration, has robbed it of a great Part of the nutritious Juice; to his conſtant Fatigues in the Field; and to his immoderate Love of all Sorts of Fruit and watery Food. 'Twas always our Opinion, that ſuch Medicines are moſt proper for him,

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as cleanse without infeebling, and restore the natural Warmth and Vigour of the Blood. In the End of the last *Decemb.* finding His Majesty's Appetite flat, his Thirst troublesome, his Cough increas'd, his Complexion pale and sickly, and his Legs swoln, which after Swadding fell in some Measure in this difficult Case, we prescrib'd some Doses of the Cream of Tartar in order to call up his Appetite, and remove his Thirst; but in regard that His Majesty had an Aversion to that Medicine from his Infancy, we afterwards exhibited some Drops of *Elixir Vitrioli* in six Ounces of the *German* Spaw Water, together with ten Ounces of the same Water soon after, to be taken every Morning for the Space of a Week. In a short Time this Prescription remov'd all the foremention'd Symptoms, excepting the Swelling of his Legs, for which we then prescrib'd Antiscorbuticks, and especially Steel. Having observ'd, that upon the drinking of the Spaw Water His Majesty voided a greater Quantity of Urine, and drank a thrice lesser Quantity of Small Beer (which we reckon'd much more pernicious than that Water) we advised His Majesty to drink more of it, upon the Apprehension, that since his Appetite continued, his Thirst decay'd, and the Passage by Urine was sufficient, it would remove, or at least put a Stop to the Swelling. But the Swelling still increasing, we turned to Diureticks.

Besides the joint Consultation above-mention'd, Dr. *Lawrence* gave in one by himself, which was to this Effect:

Though I have had the Honour, as One of His Majesty's Physicians, to be present and share in their Consultations on His Majesty's present Distemper, yet I think it may not be unserviceable to give my own private Opinion in so weighty a Case, that it may help to a clear Discovery of its Particularities, and of such Medicines as may be proper to restore His Majesty to a full State of Health.

I am fully perswaded, that His Majesty's Illness is a Scurvy, though not accompany'd with all the Symptoms that frequently appear in that Distemper; for all the Physicians agree, that the Looseness of the Teeth, the Pain and Wasting of the Gums, and the Swelling of the Legs, are Retainers to the Scurvy. 'Tis well known there are Two Kinds of the Scurvy. One happens at Sea, and is occasion'd by salt Food, which commonly infers an *Asthma*, livid Spots upon the Legs and Thighs, high coloured Water, swoln Legs, and a Weariness in all the Members. In this Case the acid Spirits and Juices are generally approv'd. All Doctors know there are no better Medicines than Acids, such as the Spirit of Salt, the Juice of Oranges, Citrons, *&c.* The other Kind happens when the Blood is weak and poor, by reason of the Deficiency or Suppression of the Spirits, which produces undigested Chyle, that instead of good Blood turns into Flegm and windy Water, unfit for Nourishment. In this Case we steer a quite different Course, and prescribe such Medicines as promote the Digestion of the Stomach, warm the Blood, enliven the Spirits, and fortify the Fibres of the Body, and are good Diureticks. These are the Methods prescrib'd by *Forestus*, *Galen*, and our Learned and Famous Dr. *Willis*, and the Experienc'd Dr. *Bates*, and is the Practice of our most Eminent Modern Physicians. The last of these I take to be His Majesty's Case; and pursuant to that Thought, have humbly advised him to the Use of the Extracts of Wormwood and Centaury, made up into Pills with prepared Steel, together with the volatile Antiscorbutick Herbs and Plants; and brew'd Drink, with an Addition of the same Ingredients, and using Catharticks once in eight or ten Days. I cannot but take Notice of His Majesty's constant Use of Sugar with all his Fruit; for next to Salt, 'tis the greatest Encourager of a Scurvy; and for that Reason I wish His Majesty would abstain from Sugar, for I am fully perswaded that nothing increases the Scurvy more, and we see daily the bad Effects of it in Young and Old who eat too much of it; therefore I would advise His Majesty to forbear it, except with acid Fruit, and eat no Fruit but when they are full ripe, and that in a moderate Quantity. The Swelling of his Legs requires a peculiar Regard, which we have not hitherto been able to stop with all our Art. This threatning Symptom requires a particular Method and Application with respect to it self alone. I am of the Opinion, that their fleshy and

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muſculous Part being now weaken'd and unbended, ſo as to become ſpongy, cannot be reinſtated in their due Firmneſs by internal Remedies. Upon the firſt Increaſe of this Swelling, His Majeſty was adviſed to ſwaddle and gently to compreſs his Legs; but that ſtruck the Swelling above his Knees, and ſo 'twas left off. Fomentations in this Caſe are ſuſpected, upon the Account that they relaxate the Parts. But whether theſe or Swaddling, in order to prevent a further Diſtention, is moſt proper, I will not pretend to determine; and therefore muſt leave it to abler Phyſicians in ſo weighty a Caſe as that of His Majeſty's Life, wherein the leaſt Miſtake may be of the moſt dangerous Conſequence.

Dr. *J. Nicholſon* gave his particular Advice, which was not read in Conſult, but in Subſtance as follows:

He ſuppos'd His Majeſty's Diſtemper to be partly a Dropſy, the curing of which he ſaid conſiſted in a very few Things, *viz.* That the Water muſt be brought from the affected Part into the Body, and iſſued again from thence by Siege, Urine or Sweat. The Firſt Way he propos'd was to void it by Sweat. For this End he preſcrib'd, 1. Freſh Oatmeal, Sand, Salt, all of them dry and warm; 2. By Stoves of Earth, or any Metal, to be always carried about with the Patient; 3. By Fumigations of Plants, Wood, Minerals, and other ſpirituous Things; 4. By Fumigations from a Hole in the Earth heated by Fire; 5. Of freſh Grains, or Herbs, Powders, or the Steam of Things boil'd. All theſe Things might be ſafely us'd.

The Second Way he propos'd, was, 1. By Bliſters, which he ſaid was ſpeedy, but dangerous; 2. By Scarifications, which was ſpeedy, but of dubious Event; 3. By Cupping or Pricking the Skin, which was certain, and ſafe, if done with Judgment.

The Third Way he propos'd, was to bring the Water from the affected Part into the Body, and evacuate it by Siege, *&c.* as above. The Legs carry every Night more or leſs Water to the Body, and by that Means were reliev'd; 1. Becauſe this was the Courſe that Nature took; 2. Experience has taught us that no Hurt can follow upon it; 3. This Water is Part of the Nouriſhment, ſo that it muſt not be evacuated too much; 4. Nature had provided no Paſſage for it in the Legs or Thighs; therefore it muſt be convey'd to the Body before it could be conveniently diſcharg'd.

In the laſt Place, Reaſon, Experience, and Neceſſity, demanding this Cure, the laſt Method would anſwer it, and undoubtedly have a good Iſſue, and ſo much the rather, in that His Majeſty had no Evacuation in his upper Parts, that he eat and ſlept well, and his Pulſe was good; therefore that Way of Cure was beſt, *viz.* to open his Body, to which the warm Seaſon of the Year would much contribute. Sign'd,

June 16. 1701. *from* Cragg-Court. *John Nicholſon.*

Beſides the Conſultations given in by the *Engliſh* Phyſicians, there were ſome drawn up by thoſe in *Holland*: Particularly Doctor *Liebergen*, Phyſician at the *Hague*, gave a ſeparate Memorial, which was to this Effect:

His Majeſty's Cough and Aſthmatick Oppreſſions proceeded not ſo much from the Weakneſs of his Lungs, as from the natural Indiſpoſition of his Midriff; the Veſſels of which, eſpecially the Nerves and Lymphæducts, being too narrow, cramp the Courſe of their Juices, and conſequently the Motion of the Midriff. When this impriſon'd Matter is ſet at Liberty by the natural Heat, the Spirits have a freer and briſker Paſſage through the Nerves; and accordingly His Majeſty has been in a Manner quite free of his *Aſthma* theſe laſt ten Years, and I have had ſeveral Aſthmatick Patients, who after the 50th or 60th Year of their Age, have been freed from their Diſtemper. This gives me Ground to hope, that His Majeſty will grow to a healthier State than before, eſpecially conſidering, that his Conſtitution is otherwiſe very hail, purſuant to the Memorial given in upon that Head. I always thought, that a moderate Uſe of ripe Fruit, freſh gather'd, was proper for him; for that Sort of Food qualifies the Chyle and the *Lympha*, and prevents their running into viſcous groſs Particles, which occaſion many Obſtructions. As for His Majeſty's drinking bottled Beer, and Liquors cool'd in Ice, I muſt ſay with *Hippocrates*, that an un-

wholeſome Diet, recommended by long Uſe, is preferable to uncuſtomary Things. I know ſeveral Inſtances of People, that, upon a ſudden Departure from cuſtomary Irregularities, have fallen into great Diſorders; ſo that I would not adviſe His Majeſty to alter his Cuſtom upon that Head. I approve of his taking Chocolate in the Morning; and I take his indefatigable Exerciſes, and Indiſpoſition to ſweat, for a Sign of a ſtrong Conſtitution. As for His Majeſty's Cough and copious Spitting, I would not have it ſtop'd, in Conſideration that he has been accuſtom'd to that Evacuation from his Infancy, and that the diſturbing of it may occaſion a worſe Evil. I can give many Inſtances of Perſons, that for Thirty or Forty Years and upwards have been troubled with a Cough, and have arriv'd at a ripe old Age, by Vertue only of a regular Diet and Way of Living, and now and then the Uſe of ſome gentle and proper Medicine. I have found by long Experience, that in Chronical Caſes, the ſimpleſt Medicines are the moſt ſucceſsful; ſuch as five or ſix Grains of *Extractum Catholicum*, or a ſmall Doſe of the Cream of Tartar, and the Uſe of ſome Cordial and Laxative Wine, Purgative and Diuretick Medicines, and indeed all other ſtrong Evacuaters, are (to my Mind) improper for His Majeſty; for, as *Hippocrates* has taught us, in all Evacuations, whether Natural or Artificial, if ſuch Things be carried off as nouriſh and ſtrengthen the Body, the Patient is injur'd; but if only ſuch Things be evacuated, as by reaſon of their Intemperature and Corruption require Evacuation, then the Patient is eas'd and ſtrengthen'd. Accordingly we find that His Majeſty's natural Evacuations have entitled him to a continued Courſe of Health. If there be Occaſion for carrying off the Crudities of the Stomach or Inteſtines, let the Operation of the Medicines go no further, that the whole Body may not be diſturb'd. I have frequently ſucceeded with this plain Medicine, *viz.* five or ſix Grains of *Extract. Catholic.* a due Doſe of the fineſt Cream of Tartar, and the Uſe of Cordials and Purgative Wine, as the Caſe required. The chief Indication in this Caſe, is to keep up the Temperature and Tone of the *Viſcera*; for which End I recommend only a Medicinal Wine, impregnated with the Roots of Elecampane, Zedoary, *Angelica* and Gentian; of the Herbs *Carduus Benedictus*, Leſſer Centaury, Southernwood, Horehound, Sage and *Marjoram*; of the Seeds of Anis, and *Cretan* Carrots; and of Cochineel. A Glaſs of this Wine may be drank juſt before Meals. In the Morning before His Majeſty takes his Chocolate, may he pleaſe to take 25 or 30 Drops of the Tincture of the Salt of Tartar in an Ounce of Mint Water, which I have found very beneficial; for it not only corrects the Intemperature of the Juices, but likewiſe fortifies the *Viſcera*. As for the Mineral Waters, I know by frequent Obſervation, that, according to their Quality, they correct and relieve the bad Juices of the Body, but that they ſeldom retrieve or fortify the Tone of the *Viſcera*, and commonly inflame the Diſorders of the Breaſt.

Another Conſultation was given in by Dr. *Sypeſtein*, Burgomaſter of *Utrecht*; Dr. *Bidloo*, Profeſſor at *Leyden*; and Dr. *Vallan*, Profeſſor at *Utrecht*. The Purport of this is as follows:

The Memorial relating to His Majeſty's Conſtitution informs us, that His Majeſty has been ſeldom or never troubled with Fevers, or other Diſtempers, till within theſe five or ſix Years, ſo that the Juices of the Body incline more to an Acidity now than before; upon which we conclude, that the principal Parts are weaker, the Chyle being not ſufficiently digeſted, ſo that the Blood and the other Juices are imperfectly mix'd, and unprovided with a ſufficient Stock of Spirits. Now the Blood and other Juices being thus render'd cold, wateriſh and faint, the ſolid Parts muſt have leſs Vigour and Firmneſs, which gives Occaſion to Defluxions, ſometimes on one Part, and ſometimes upon another. Hence ſprings the Swelling of His Majeſty's Legs, the Looſeneſs of his Teeth, and the Bleeding of the Gums, which in Time may be follow'd by a Dropſy. His Majeſty's ſitting Forty Hours on Horſeback in his Boots has contributed much towards the Swelling of his Legs, as well as his conſtant Fatigue in the Field, and the Uſe of moiſt and over-cooling Drink and Victuals. In this Caſe, we muſt think of Means to leſſen the Seroſity, invigorate the Blood and Juices,

Juices, animate the Spirits, and fortify the Parts. To this End we recommend a fortifying Medicinal Wine, which may be a little Diuretick, and only Laxative; for His Majesty having two or three Stools a Day naturally, we are of the Opinion, that all strong Evacuations, of what Sort soever, are dangerous. The Wine may be made thus: Take, of the Roots of Horse Radish, an Ounce; Roots of Elecampane, half an Ounce; Baum and Trefoil, of each a Handful; Centaury and Scurvigrass, of each three Handfuls; Carrot Seeds, Nettle Seeds, and Citron Peel, of each three Drams; Rhubarb, two Ounces; infuse all in Forty Ounces of *French* or *Rhenish* Wine; of which His Majesty may take four or five Ounces twice a Week in the Morning. For daily Use give the following Mixture: Take, Mint Water and Diaphoretick Water, of each three Ounces; Spirit of Nitre dulcified, half a Dram; Confection of Hyacinth, two Drams; Syrup of Maiden-Hair, half an Ounce; mix, and exhibit two Spoonfuls twice a Day on an empty Stomach. In the Room of this Mixture, His Majesty may take a Spoonful of our Antiscorbutick Infusion, mixing with it a little of the Juice of good Oranges, or of ripe *Spanish* Citrons, in order to qualify its Heat. The dulcified Spirit of Nitre or of Salt, and Chalybeate Waters, are likewise proper. To gratify the Taste, the abovementioned Mixture or Infusion may be exchang'd for the following *Conditum*: Take, of the Roots of Elecampane preserv'd, a Dram; Orange Peel preserv'd, two Ounces; Conserve of Garden Scurvigrass, and *Roman* Wormwood, two Drams; the compound Powder of *Aron*, half a Dram; prepar'd Pearl, a Dram; with a sufficient Quantity of the Syrup of Mint; make a Confection. In order to dissipate the serous Humours in his Legs and Thighs by insensible Transpiration, His Majesty may take early in the Morning half a Scruple of the Bezoar-Stone, with five Grains of the Bezoar-Mineral. 'Tis likewise to be consider'd, whether it may not be of Use to take now and then an Ounce, or an Ounce and a half, of the Infusion of Steel in *Malmsey* Wine. The Tincture of Tartar is also useful. In the mean time Care must be taken that the Expectoration be not hinder'd, for fear the Oppression of the Breast should return. While the above-mention'd corroborating Medicines are made use of, let all Purgatives be carefully avoided; for they destroy all the Benefit accruing from the other, as Dr. *Sydenham* has well observ'd. As for external Application, with Reference to the Swelling of his Legs and Thighs, let the Parts be stroak'd in the Morning with a warm and soft Hand, dropping upon it a few Drops of the Queen of *Hungary*'s Water, or the *Spiritus Matricalis*. This will help to preserve the natural Heat, and strengthen the flaggy musculous Fibres. To prevent the Increase of the Swelling, he may swathe his Legs, or wear laced Stockings both above and below the Knee. Considering that His Majesty is now more sensible of Cold than before, we would advise him in the cold Season to have his Breeches lined with good *English* Lamb-Skins. As for his Diet, we wish he would be pleased heedfully to abstain from all moist Food, and cold Drink, especially that cool'd in Ice. Much Fruit is highly pernicious, though a moderate Quantity of good ripe Fruit, in their proper Seasons, is not amiss. Moderate Rest and Motion, especially Walking, is none of the least considerable Means.

Dr. *Reiners*, Burgomaster of *Nimeguen*, wrote to Dr. *Bidloo* the 27th of *July*, 1701. in Substance as follows:

'I have read the Prescriptions which you 'sent me by His Majesty's Orders again and 'again with great Satisfaction, but dare give 'no positive Advice in the Case, without in'curring the Censure of Temerity, since the 'Physicians don't agree, and that the Case 'is so nice, as that of a Patient on whose 'Preservation the Welfare of *Europe* de'pends: Therefore I could have wish'd to 'have had the Honour to see His Majesty 'himself, that I might, with you and the 'other Experienc'd Doctors, have consulted 'about the most proper Medicines; because 'you very well know, that a great many 'Difficulties lie in the Way against a Physi'cian's giving his Advice about a Patient 'that he has not seen, and whose Case he 'has not examin'd, even though it be drawn 'up by an Experienc'd Physician. But as to 'the Prevention of the Swelling of his Legs, 'which I perceive is the greatest Difficulty;

'I'm of Opinion, with Submiſſion, that ex-'ternal Medicines ſhould be applied as much 'as poſſible, and that it may not be unſer-'viceable to make uſe of a dry and ſpiri-'tuous Fomentation, that may imbibe the 'Moiſture, provided the Obſtructions be not 'too tough and viſcous, of which there is 'nothing diſtinctly ſpoken in the Caſe I 'have ſeen. You may depend upon my Se-'crecy, and I ſhall be glad to hear further 'from you.

The Swelling of his Legs, with the Decay of Appetite and Strength, having increaſed from Time to Time, he went to *Holland* in *July*, 1701. At that Time his Legs were ſwell'd a great way above the Knee, being Lead-colour'd, and very cold. His Majeſty, calling for Dr. *Bidloo*, ſpake to this Effect: *I have been adviſed to drink Spaw Water, and ſince that I am grown worſe than ever you ſaw me.* The Doctor anſwer'd, That His Majeſty's Diſtemper proceeded from an Exceſs of indigeſted Moiſture and windy Swellings, which were not to be cur'd by cold Waters. To which His Majeſty reply'd, *When I complain of the Spaw Water, they tell me, I muſt drink more of it, and drink it faſter, that the Quantity may make its Way: But the more I drink, the worſe I am; and for that Reaſon I am againſt it.* The firſt Thing he made uſe of in *Holland* for that Seaſon, was Pills made of the volatile Salt of Amber, Salt of Tartar, *Anima Hepatis*, and Extract of Gentian; together with a Powder, for external Uſe, of the Flowers of Elder, Camomil, Lavender and Roſes, Wormwood Tops, Cummin Seeds, Crabs Eyes and Flour. This Powder was rubbed upon his Legs with Flannel, and His Majeſty found it recover'd the Senſe of his Legs in a great Meaſure.

Auguſt 6. 1701. His Majeſty being at *Loo*, ſpoke to Dr. *Bidloo*, before a great Court, after this Manner: 'Do you think my Diſ-'eaſe is no Dropſy? Will not the Swaddling 'carry the Seroſity out of my Legs into my 'Belly? Some of the *Engliſh* Doctors ſaid 'ſo, and others deny'd it. But ſome ſaid 'that I have a Dropſy, or at leaſt the Be-'ginning of one. After ſome Interruption, His Majeſty added, 'What I have uſed of 'late has done me more Harm than Good: 'But now what have you concluded upon 'among your ſelves? Dr. *Bidloo* having made a ſuitable Anſwer, His Majeſty replied, 'Well, come, do what you think proper; 'I ſhall try it for a Week or two, and if I 'find no Benefit, then I'll leave it off. Se-'cretary *Dallonne* ſhall acquaint you with 'what the *Engliſh* Doctors have preſcrib'd, 'and give you Copies of it. He ſhall alſo 'ſend to others, and you may communicate 'their Preſcriptions to ſuch other Phyſicians 'as you think fit, without letting them 'know that 'tis for me: But come to me 'every Morning and Evening, and then you 'will be the better able to judge of the 'Swelling of my Legs, and other Diſtem-'pers. Upon that His Majeſty's Legs were rubbed twice a Day with warm Flannel, and eſpecially upon his Return from Hunting, and were ſwaddled up in Flannel Swathes. He took inwardly the Pills laſt mention'd, as alſo Pills of the Oriental Bezoar and Bezoar Mineral, made up with the Balſamick Syrup. In a few Weeks after, His Majeſty was much better, and in the Preſence of a great Concourſe of Nobility and Gentry at *Dieren*, ſpoke to this Effect: *Could I but continue as I now am, I ſhould ſay I were cur'd. Do but look upon my Legs, they are not ſwell'd at all, excepting about the Ankle, which has been ſo for ſeveral Years, and never troubled me.* At that Time His Majeſty hunted very hard, and was very intent upon Shooting and Fiſhing, in which Exerciſes he ſweat pretty well, though the Force of Medicines could ſcarce produce that Effect. When His Majeſty took the ſweating Powders of Bezoar Mineral and Oriental Bezoar, he always complain'd that they made him hot, dry, and uneaſy. Upon a certain Occaſion of that Nature he expreſs'd himſelf thus: *I know very well that all Sudorifick Medicines do me an Injury. Limonade, or ſuch Sort of Liquors, will ſooner make me ſweat than this will.* About the Middle of *September*, His Majeſty's Teeth being looſe, and his Gums affected with Pain, he was adviſed to waſh his Mouth with the Tincture of Myrrh and fair Water. His Stomach beginning to fail, he made uſe of the *Conditum* mention'd in the laſt of the fore-cited Conſultations; and after once uſing it, recover'd his wonted Appetite.

His

His Majeſty continued in this healthy State, till one Day that he rode out on Horſeback early, in a rainy Morning, from *Dieren* to *Doesbourg*, and from thence in his Coach to the Houſe in the *Voorſt*, where he was taken at Night with a Chillneſs and Shivering, and a Heavineſs in his Legs. He alledg'd, that he had catch'd Cold in the Morning by the Rain getting into his Neck. He went early to Bed that Night, having firſt drank ſome hot Caudle; and went a hunting in ſuch a heavy and laſting Rain, that he was all over wet, and ſcarce any Body that was with him could hold it till the Chaſe was over. This Night His Majeſty ſlept very well, and the next Morning he ſpoke to this Purpoſe: *I find my ſelf very well; I knew very well that this Hunting-bout would do me Good. I was wet in my Knees and Toes, and yet I am much better than I was Yeſterday.* But this did not hold long; for ſoon after His Majeſty was ſeiz'd with a grievous Cold, and loſt his Stomach, inſomuch that he loath'd even Fiſh and Fruit, and avoided all Exerciſes; upon which he grew very weak. However, the Weather beginning to be cold, His Majeſty went from *Loo* to the *Hague*, where Doctors *Sypeſtein*, *Bidloo* and *Lawrence*, preſcrib'd for him a Draught, to be took every Morning, of an Ounce and a half of Barley Water, half an Ounce of Radiſh Water, and eight Drops of the dulcified Spirit of Nitre. *October* 28. His Majeſty being ſomewhat coſtive, was purg'd with Reſin of Jalap, and Extract of Rhubarb. A few Days after, ſome Drops of the Tincture of Myrrh and Saffron were added to the foregoing Draught. *November* 2. His Majeſty took a Gliſter, which operated very agreeably.

Sir *Thomas Millington*, His Majeſty's Eldeſt Phyſician, wrote to Dr. *Bidloo* in *Latin* to the following Effect:

SIR,

'I Receiv'd your Letter Yeſternight, when I was ill in Bed, to which I have been 'confin'd for many Days, ſo that I cannot 'perform my Office as I would. The An'ſwer which Dr. *Hutton* gave to your Letter 'from the *Hague* on my Account, was very 'true and juſt; but I hope to recover, and 'to have the Honour of conferring with you 'here upon His Majeſtys Return, which is 'ſo heartily pray'd for by my ſelf, and all 'the good People of *England*.

Dated Novemb. 11. *O. S.* 1701.

Novemb. 14. *N. S.* 1701. His Majeſty embark'd for *England*, and fed heartily upon ſome Haddocks that a Fiſherman threw into the Yacht, as ſoon as he paſs'd the Flats. At Night His Majeſty call'd for Dr. *Bidloo*, (who was on Board the ſame Yacht) and ſpoke to this Purpoſe: *I am ſick; it blows very hard; pray, feel my Pulſe; I am ſqueamiſh, and I ſhiver with Cold.* After that His Majeſty vomited a little, and then went to Sleep for three Hours in his Clothes, with a great Weight of Coverings upon him. When they deſcry'd Land, His Majeſty ſaid, *I hear we are in Sight of Land; I'll quit the Yacht as ſoon as ever I can, for I am very bad. November* 15. At Seven a Clock in the Morning, His Majeſty landed at *Margaret*, and lay that Night at *Canterbury*, in Mr. *Rottermont*, an Apothecary, his Houſe, where of his own accord he call'd for a Gliſter, upon the Account of an unwonted Coſtiveneſs. This Gliſter made him quite another Man, for after its Operation he laugh'd and talk'd very heartily. When Dr. *Bidloo* told His Majeſty, that the Gliſter was his own Preſcription, and that Mr. *Rottermont* had prepar'd it without a Receipt, he replied, *'Twill produce no ill Effects.* And here 'tis to be obſerv'd, that one Phyſician alone is prohibited to preſcribe any Thing for the King or Queen of *England*, under the Pain of Death. There muſt always be Three Phyſicians, or at leaſt Two, even in the greateſt Extremity. But this extends only to internal (not external) Remedies. In dangerous Caſes, all Preſcriptions muſt be approv'd by the Council, and the Phyſicians are call'd by the Lord-Chamberlain.

Nov. 16. *N. S.* 1701. His Majeſty arriv'd at *Hampton-Court* at Eight a Clock at Night; and the next Morning Doctors *Hutton*, *Blackmore*, *Lawrence* and *Bidloo*, preſcrib'd Forty Drops of the Tincture of the Salt of Tartar, to be took Morning and Evening in a Draught of Medicinal Wine. Soon after the Swelling of his Legs fell ſo much, that on the 20th he expreſs'd himſelf to this Effect:

fect: *I did not think that one could recover ſo ſoon; I rode out Yeſterday on Horſeback, and eat luſtily.* His Majeſty din'd that Day in Publick with the Princeſs and the Prince of *Denmark*, and diſpatch'd a great deal of Buſineſs in Council, and elſewhere. At Night his Legs being more ſwell'd, *As I take it*, ſaid his Majeſty, *this is occaſioned by ſtanding ſo long.* *Nov.* 21. his Majeſty's Legs being much better, he expreſs'd himſelf thus, *I now begin to return to my old Way of Living.* *Nov.* 23. his Phyſicians adviſed him to eat more moderately; but, without regarding their Remonſtrances, he eat more than ordinary, both at Noon and Night; and when he went to Bed was very ſleepy, but his Legs were much ſwell'd. The 23d being much refreſh'd with Sleeping, he took a gentle Purge. The 25th his Legs were in a tolerable Condition, and he breath'd freely. The 27th he ſlept in a Chair for a long while, and had no Appetite. The 28th he was better, and went a ſhooting. The 29th *N. S.* Dr. *Hutton* and Dr. *Blackmore* being called to the Court by my Lord Chamberlain, found his Majeſty's Legs a little thicker than ordinary, and join'd with Dr. *Bidloo* in the following Preſcription.

Take of the Extract of Rhubarb, a Scruple; Reſin of Jalap, ſix Grains; Tartar vitriolated, five Grains: With a ſufficient Quantity of Balſamick Syrup, make Pills to be taken early in the Morning.

Exhibit twice a Day 20 Drops of the Tincture of Saſſafras, extracted with the Tincture of Salt of Tartar. Repeat the Pills made of the Volatil Salt of Amber, Extract of Gentian, *&c.*

Take of the Roots of *Florentine* Orris and Tormentil, the Tops of Southernwood, *Roman* Wormwood, Roſemary-Flowers, Pomegranate-Flowers, Leaves of *Marjoram* and Thyme, *Olibanum* and *Benjamin*, of each a ſufficient Quantity. Make a Fumigation for his Majeſty's Legs.

Soon after his Majeſty affirm'd, that for ſeveral Years he had always obſerv'd a Diſorder in his Legs, when he rode in his Coach. Upon the Uſe of the above-mention'd Remedies, his Majeſty recovered apace, and, *Decemb.* 6. ſpoke to this Purpoſe: *I find my ſelf very well, I have eat with a good Appetite, and my Legs are fallen in ſome Measure.* His Majeſty drank frequently of the Emulſion of Almonds, made, by his own Order, of Almonds, Barley-water, and a little Cinnamon, and thought that it made him ſleep better: In a Word, the Swelling of his Legs abated very much, his Expectoration was free and copious, and his Pulſe was ſtrong and regular. He continued in this State till *Sunday, December* 11. *N. S.* at which Time the Weather was very damp and cloudy; and at Night his Majeſty's Legs and Knees were ſwell'd, his Spirits ſunk, and he breath'd with Difficulty. As he went to Bed, he ſaid, *He believ'd he had eat too much at Noon*; and, indeed, his Phyſicians were of the ſame Mind. The next Day, when ſome of his Phyſicians were by, he thus accoſted them. *Some Gentlemen are afraid that in a ſhort Time the Dropſie will get into my Belly; which makes me conſider whether the Swathes ought not to be took off my Legs.* Upon this Dr. *Bidloo* ask'd his Majeſty, If he himſelf likewiſe was apprehenſive of the ſame Conſequence: But his Majeſty's Anſwer was to this Purpoſe; *Tell me poſitively, Do you truly believe that I have not a Dropſie?* Dr. *Bidloo* having acquainted him, that ſuch was his Belief, upon the Account that his Majeſty was neither feveriſh, thirſty, nor pale; his Majeſty replied, *It muſt have a Beginning. However, my Legs are always ſwell'd; Can't that Swelling be remov'd? For, if it reaches above my Knees, I ſhall walk like a ſprain'd Hare; and if it goes further, I doubt I ſhall not be able to go a Step.* Upon that, Dr. *Bidloo* propoſed the Sweating of his Legs in a Stove; and his Majeſty reply'd to this Purpoſe: *How can that ſucceed? 'Twill heat me; beſides that, no Force can make me ſweat. I have been often told, that if I could ſweat I was cured: But as ſoon as I take any ſudorifick Medicine, I become thirſty, and then I cannot ſleep, and I am oppreſs'd in my Breaſt.* This ſaid, Dr. *Bidloo* gave his Majeſty to know, that a Stove might be contriv'd ſo, as not to affect his upper Parts; and then his Majeſty gave Orders for the preparing of it. On the 14th, Dr. *Lawrence* propoſed a Purge for his Majeſty, who anſwered, That he had no need of any. The 17th his Majeſty found himſelf ſo well, that he ſaid he would give over the taking of Medicines in a Day or two's time; (for he had all along uſed the

Pills laſt mentioned, and the Tincture of Saſſafras.) However, he declared, that whenever he drank Tea, he would make uſe of the Extract of Saſſafras. The 19th his Majeſty complain'd of a Swelling in his *Scrotum*, which ſeem'd to be occaſioned by hard riding. This Swelling vaniſh'd before Night. At this Time his Majeſty was perſwaded to go earlier to Bed then uſually, for after that he always found himſelf better. The 25th his Majeſty was troubled with the Tooth-ach, and his Left Cheek was ſwell'd, to which they applied ſome Spirit of Lavender, with a Sponge.

December 27. *N. S.* the North Wind blew very cold, and his Majeſty's Legs ſwell'd; upon which he took the Pills of the volatil Salt of Amber. On the 28th, Drs. *Hutton*, *Lawrence*, *Blackmore* and *Bidloo*, agreed upon the following Recipe.

Take of the Reſin of Jalap, eight Grains; Extract of Rhubarb, a Scruple; Salt of Tartar, five Grains; Oil of Aniſe-ſeed, one Drop: With a ſufficient Quantity of the Balſamick Syrup, make Pills to be taken to Morrow Morning.

Take of *Bates*'s Diuretick Salt, a Dram: With a ſufficient Quantity of the Rob of Juniper, make Pills to be taken the next Day after the Purgation.

December 30. *N. S.* His Majeſty was much better. The 31ſt he took ſome Muſtard-ſeed in his Chocolate early in the Morning. *January* 1. his Majeſty uſed the Stove for his Legs, and liked it mightily. *Jan.* 2. he uſed it again, and expreſs'd himſelf to this Purpoſe: *If any Thing can benefit me, I am perſwaded this will: I have been always told, that my Legs muſt ſweat, and now by this Contrivance they ſweat ſpeedily, and with Eaſe.* Now the Stove was contriv'd after the following Manner. 'Twas of dry Oak, there being a great ſquare Space in the middle, which received the Legs and Thighs, and a little Stove on each Side of that Square for holding the Lamps. The Lamp was filled with the Spirit of Lavender-Flowers, that Smell being moſt acceptable to his Majeſty. The great Square in the Middle was lined within with Flannel, and adorn'd on the Out-ſide with large Sattin-Trappings. The little Stoves were lined with Copper, which was done over with Lattin; and had each of them Three Holes, pointing towards the middle Square, beſides one on the Outſide, by which the Lamp was put in. When this laſt Hole was ſtopp'd with a round Plate made for the Purpoſe, the Lamp went out. This Stove was made uſe of by his Majeſty almoſt every Day, and ſometimes twice a Day; and for ſome Time he wore Flannel-Stockings all Night, though at laſt he left them off, upon the Apprehenſion that they over-heated him, and diſturb'd his Reſt. The Stove had ſuch Succeſs, that on the 8th of *January* his Majeſty expreſs'd himſelf to this Purpoſe; *I find my ſelf well after the Sweating, and my Legs are much fallen.* On the 9th, while he was in the Stove, he told Dr. *Lawrence*, That the Warmth did him good in his Belly; and turning to the Duke of *Ormond*, my Lord *Rumney*, and ſeveral other Noblemen: *Do but ſee*, ſays he; *one may moderate the Heat as he pleaſes.* The 14th his Majeſty declar'd, That he could walk better than before. In the mean Time his Majeſty frequently made uſe of Muſtard-ſeed mix'd with Sugar; but by the Phyſicians Orders, there was as little Sugar as might be. The 17th, he told my Lord *Scarborough*, and ſeveral others, That he found the Sweating of his Legs very beneficial. When Dr. *Blackmore* ask'd him, If he had any Difficulty of Reſpiration, or Giddineſs, or if he felt any Heat above the Cover of the Stove; he anſwer'd, with a pleaſant Countenance, *Not at all.* The 19th, the Swelling of his Legs was ſo much fallen, that they were oblig'd to cut a Piece off the Swathes. That Night his Majeſty eat ſome *Scotch* Pottage; and after that eat of them frequently at Night. The 26th He took a Doſe of the purging Pills, laſt preſcrib'd.

Feb. 1. *N.S.* His Majeſty was ſhort breath'd, and his Legs ſwell'd; but on the 2d, he was better. *Feb.* 3. Dr. *Blackmore* and Dr. *Lawrence* intreated his Majeſty to continue the Uſe of the Stove, and the Swathes, and the Taking of Muſtard-ſeed. Upon that his Majeſty reply'd to this Effect: *I find now you approve of the Swaddling of my Legs, tho' laſt Year you were againſt it, and preſs'd me to leave it off.* On the 13th, ſome Oil of *Rhodium* was put into the Stove, by reaſon that the daily heating of it had given the Oak a diſagreeable Smell. *Feb.* 16. the Swelling increaſing,

creaſing, Dr. *Bidloo* pray'd his Majeſty to go intothe Stove that Night, but receiv'd this Anſwer, *'Tis no great Matter, I muſt go to Bed.* The 21ſt, his Legs ſwell'd again, and he breath'd with Difficulty. The 27th, Dr. *Blackmore*, after the Feeling of his Pulſe, and Viewing of his Legs, ſaid, That his Majeſty had recover'd his Strength in a conſiderable Meaſure, and that the Hydropical Humour was much abated. The 28th, his Majeſty was troubled with an Uneaſineſs in his Stomach, and Wind or Belching; upon which Account Dr. *Hutton*, Dr. *Lawrence*, and Dr. *Bidloo*, agreed upon the following Preſcription.

Take of the Conſerve of Mint, half an Ounce; Orange-Peel preſerv'd, an Ounce; Coriander-ſeed, a Scruple; Syrup of Succory with Rhubarb, half an Ounce. Mix according to Art; and exhibit the Quantity of a Walnut every Day at Seven a Clock in the Morning.

March 4. *N. S.* His Majeſty unfortunately fell off his Horſe, and came to *Kenſington* at Nine a Clock at Night with his Right Arm tied up. As he enter'd the great Bed-Chamber, he ſaw Dr. *Bidloo*, to whom he ſpoke in this Manner: *I have got a Hurt in my Arm, pray come and ſee it.* Soon after, he continued to this Effect.: *I was a Riding in the Park at Noon, and while I endeavoured to make the Horſe change his Walking into a Gallop, he fell upon his Knees: Upon that I meant to raiſe him with the Bridle, but he fell forwards to one Side, and ſo I fell with my Right Shoulder upon the Ground. 'Tis a ſtrange Thing, for it happen'd upon a ſmooth level Ground. Ronſiat* (his Majeſty's Surgeon) *ſays, There's a little Bone broken; and, indeed, I feel ſome Pain towards my Back.* At the ſame Time he pointed with his Left Hand to the Shoulder-Blade, ſaying, *There, there.* Dr. *Bidloo* finding his Pulſe in good Order, diſſwaded him from Bleeding; and after Viewing the affected Part, gave his Majeſty to know, That the Right Channel-Bone was broke obliquely a little below its Juncture with the Shoulder-Blade. Then his Majeſty ask'd, *If it was well ſet?* And the Doctor anſwering, *No*; he ſaid to Mr. *Ronſiat*, his Surgeon, *Juſtify your ſelf Monſieur* Ronſiat, *Is it well ſet?* Mr. *Ronſiat* made Anſwer, *That it was well ſet; but that the Jolting of the Coach, and the Looſening of the Bandage, had occaſioned that Diſunion.* After the Fracture was taken Care of, his Majeſty went to Bed, and ſlept the whole Night ſo ſound, that the Gentlemen who ſate up with him, ſaid, They did not hear him complain ſo much as once.

March 5. *N. S.* His Majeſty had not the leaſt Pain, neither was he feveriſh, and the Swelling round the Fracture was very moderate. He had Three Stools that Day, and eat heartily at Noon. At Night when they were about to rectify the Ligature that was ſomewhat looſe, his Majeſty ſpoke to this Purpoſe: *I aſſure you I will hold my Arm very ſtill; do not tie it harder, for if you do, 'twill hinder my breathing.* The 6th, Things continued in the ſame State; and his Majeſty was viſited by great Numbers of the Nobility and Gentry, and particularly by the Archbiſhop of *Canterbury*, who pray'd in the little Bed-Chamber.

March 7. At Night he wrote Two Letters. The 9th, his Majeſty's Legs ſwell'd a little more than ordinary, and he did not ſleep ſo well as before. On his Left Knee there was a painful reddiſh Swelling, which was much abated by the Application of the Spirit of Lavender, with ſeveral Plaits of Cloth made warm. The 10th, the Bandage being took off, his Phyſicians perceived that the Fracture did not join, upon which a proper Bandage was renew'd. The Swelling round the Fracture was very inconſiderable; but they obſerv'd a Swelling all over his Body, eſpecially in his Right Hand. However, he eat with a good Appetite, went to Stool regularly, and felt no Pain; and at Night went to Bed with an Inclination to ſleep, having firſt walked a little on Dr. *Bidloo*'s Arm. The 11th, *N. S.* the Swelling of his Knee dwindled, but that of his Legs and one of his Hands encreas'd; nay, his Elbow began to be affected. This was imputed to his abſtaining from Motion for ſome Days, while he eat and drank plentifully, and to the Hanging of his Arm; upon which 'twas rais'd a little higher. The 13th, His Majeſty made uſe of the Sweating-Stove. The 14th, he was better, and having walked in the great Gallery, fell aſleep in a Chair; after which he was taken at Night with a Shiver-

ing and a Feverishness, and refusing to take any Thing against it, went to Bed at Eleven a Clock. He slept well that Night; but in the Afternoon the next Day he was seiz'd with a Cough and an Ague, which lasted till 'twas late: And in the mean time he would neither lie upon the Bed nor put on his Gown. His Physicians being then call'd, Doctors *Blackmore*, *Lawrence* and *Bidloo*, prescrib'd as follows:

Take, the Powder of Crabs Claws, and the *Countess*'s Powder, of each twelve Grains; make a Powder, to be exhibited immediately, and repeated to Morrow Morning in a Spoonful of the following Julep, four Spoonfuls of which are to be drunk after it.

Take, of Black-Cherry Water, eight Ounces; Epidemick Water, two Ounces; prepar'd Pearl, a Dram and a half; with a sufficient Quantity of White Sugar; make a Julep, and exhibit four Spoonfuls when he languishes.

Take, the Roots of Comfry the greater, and *Florence* Orrice, of each half an Ounce; Leaves of Agrimony and Maiden-Hair, of each half a Handful; Fat Figs and Dates, of each five in Number; Fennel Seeds, a Dram; boil them in a sufficient Quantity of Barley Water to two Pound, and add to the strain'd Liquor *Fernelius*'s Syrup of Marsh-mallows, and the Syrup of Corn-Poppies, of each half an Ounce; clarify the Decoction, and exhibit three or four Ounces thrice a Day.

However, His Majesty took nothing that Night, but went to Bed between Eight and Nine. The 16th, *N. S.* He rose at Seven a Clock in the Morning, and after drinking some Almond Water, took the prescrib'd Powder; but in the Afternoon he was like to fall into a Looseness; upon which a Glister was propos'd, but he refus'd to take it, as well as to drink the prescrib'd Pectoral Draught, saying, *That the Figs alone gave him an Aversion to it.* Upon that, Doctors *Millington*, *Hutton*, *Blackmore*, *Lawrence*, *Bidloo* and *Browne*, made the following Prescription:

Take, of *Venice* Treacle, the Species of the Confection of *Hyacinth*, of each a Scruple; the Powder of Crabs Claws and Coral, of each fifteen Grains; with a sufficient Quantity of the Syrup of Corn-Poppies; make a *Bolus*, to be taken about Six a Clock at Night, and repeated every six Hours while the Looseness continues, drinking upon it a Draught of the above-prescrib'd Decoction, or four Spoonfuls of the Pearl'd Julep.

The 17th, *N. S.* His Majesty was very weak, and had an Aversion to Food. In the Afternoon he vomited up a greenish Matter, which smell'd strong. Upon that, he spoke to Dr. *Bidloo* to this Effect: *I am very weak; every Day a new Distemper seizes me; Yesterday a Looseness, and now a Vomiting; clap your Hand to my Pulse, and feel how low it is.* Then the Doctor let him know, that the Vomiting might prove a Critical Evacuation; and receiv'd this Answer, *What do the other Doctors say of it? Where are they?* Soon after Dr. *Millington* and Dr. *Blackmore* came, and after intreating His Majesty to eat something, and to use the proper Medicines, in order to keep up his Strength, drew up the following *Receipt*:

Repeat the Pearl'd Julep, adding to it a Dram of the Powder of Crabs Claws; exhibit four Spoonfuls when he languishes, and especially when the Paroxysm approaches.

Take, the Powder of Crabs Eyes, and the *Countess*'s Powder, of each twelve Grains; with a sufficient Quantity of the Syrup of red Poppies; make a *Bolus*, to be taken every third Hour, drinking afterwards four Spoonfuls of the Pearl'd Julep.

Continue the Use of the White Decoction.

Add fifteen Drops of the *Sal Volatile Oleosum* to each Draught of the White Decoction, or of the Julep.

The Physicians were of the Opinion, that if they could but keep up his Strength, he might weather the Disease; but when they spoke to him again of eating, he made Answer to this Purpose: *Believe me, Gentlemen, I know particularly well that forc'd Feeding does me no Good.* About Eight a Clock at Night he went to Bed, but slept very little.

The 18th, *N. S.* His Majesty was very weak, and after Noon had a small Fit of his Fever. In the mean time he us'd proper Remedies, pursuant to the following *Recipe*:

Apply the great Stomachick Plaister to the Region of the Ventricle.

Exhibit immediately half a Dram of Sir *Walter Ranleigh*'s great Cordial, repeating it

every Hour, and giving after it four Spoonfuls of the following Julep:

Take, of Black-Cherry Water, five Ounces; Milk Water, five Ounces; Plague Water, two Ounces; Small Cinnamon Water, a Dram; with a ſufficient Quantity of Sugar; make a Julep. Continue the Uſe of the White Decoction. Continue the Uſe of the *Sal Volatile Oleoſum.*

In the languiſhing Fits, exhibit 20 Drops of the Tincture of Saffron in a Draught of the White Decoction, or Cordial Julep.

Sign'd,

T. Millington, J. Hutton,
R. Blackmore, T. Lawrence,
G. Bidloo, E. Browne,
Ch. Harrel.

Towards the Evening the Phyſicians made the following Preſcription:

Take, of the Extract of the Jeſuits Bark, two Drams; and make it into Twenty four Pills, four of which are to be taken every third Hour in the Intervals of the Fits, drinking upon them three or four Spoonfuls of the Julep laſt preſcrib'd.

In the mean time an extraordinary Council was call'd, before whom the Phyſicians appear'd frequently; and at laſt acquainted them, by Sir *Thomas Millington*, their Speaker, That all their Hopes (under God) depended upon the taking ſome Food, and the Uſe of the foregoing Remedies. Upon this, the Duke of *Devonſhire*, and ſeveral other Noblemen, deſir'd Doctor *Bidloo* to preſs His Majeſty to take ſomething. Accordingly Dr. *Bidloo* ſpoke to him in *Dutch*, and His Majeſty made Anſwer; *Lift me up, and I'll take as much as I can of what is thought proper.* Then he took ſome of *Rawleigh*'s Cordial, with the Cordial Julep, and ſoon after ſome hot Claret. Between One and Two the next Morning he took ſome more of the above-preſcrib'd Remedies. About Three a Clock in the Morning he call'd for Dr. *Bidloo*, and expreſs'd himſelf to this Purpoſe: *I have a bad Night on't; I do not ſleep:* Upon that he ſate up, and lean'd upon him, ſaying, *I could ſleep in this Poſture; ſit nearer me, and hold me ſo for a little Time.* In this Poſture he ſlept about half an Hour, and when he wak'd, ſaid, *You can bear me up no longer.* Then he was held up by Mr. *Freeman* on the Right Side, and Mr. *Sanel* on the Left, both of them having Pillows in their Arms. Soon after the Phyſicians gave Notice, that they were apprehenſive he had not long to live. The Archbiſhop of *Canterbury* being thereupon call'd, adminiſtred the Holy Sacrament to His Majeſty about Five a Clock in the Morning. Amidſt the Tears of all the Byſtanders, His Majeſty did not betray the leaſt Concern, but was very devout and friendly, ſpeaking ſometimes to my Lord *Albemarle*, and the other Great People that ſtood by his Bed-ſide, and particularly with my Lord *Overkirk*; upon which Occaſion he rais'd his Voice in a diſtinguiſhing Manner. He took Leave of them with a great deal of Satisfaction, and having ſettled ſome other Affairs, call'd for ſome of his Servants in particular. After Seven a Clock he took Dr. *Bidloo* by the Hand, and return'd him hearty Thanks for all his faithful Services. Soon after, breathing with great Difficulty, he ask'd the Doctor, *If this could laſt long?* The Doctor anſwering, *No*, he ask'd again, *How long?* To which the Doctor reply'd, *An Hour, or an Hour and half, though you may be ſnatch'd away in the Twinkling of an Eye.* After that, while the Doctor was feeling his Pulſe, he took him by the Hand, ſaying, *I do not die yet, hold me faſt.* Having taken a little of the Cordial Potion preſcrib'd above, he ſpoke to ſome Perſons that he had call'd for, and at laſt to my Lord *Portland*, who laid his Ear to his Mouth, but could only diſtinguiſh ſome few Words. About Eight a Clock he lean'd a little backwards, towards the Left Shoulder, and ſhutting his Eyes, expir'd with two or three ſoft Gaſps.

Thus died the Great *William* of *England*, at the Age of One and Fifty Years, Four Months, and Six Days, after he had reign'd Thirteen Years, and One Month, lacking Five Days, without having ever any legitimate or illegitimate Children. Upon the Tenth the Royal Body was open'd, and the following Account given of the Diſſection:

1. UPon viewing the Body, before the Diſſection, the following Appearances were remarkable.

The Body in general was much emaciated.

Both

Both the Legs up to the Knees, and a little higher, as alſo the Right Hand and Arm, as far as the Elbow, were conſiderably ſwell'd.

There was likewiſe on the Left Thigh, near the Hip, a Bladder full of Water as big as a ſmall Pullet's Egg, reſembling a Blane.

2. Upon opening the Belly, the Guts were found of a livid Colour, and the Blood contain'd in their Veſſels black.

The Gut call'd *Ileon* had in ſome Places the Marks of a ſlight Inflammation.

The Stomach, *Pancreas*, Meſentery, Liver, Gall-Bladder, Spleen and Kidneys, were all ſound, and without Fault.

3. In the *Thorax* or Cheſt, we obſerv'd, that the Right Side of the *Lungs* adher'd to the *Pleura*, and the Left much more; from which, upon Separation, there iſſued forth a Quantity of purulent or frothy *Serum*.

The *Upper Lobe* on the Left Side of the Lungs, and the Part of the *Pleura* next to it, were inflamed to a Degree of Mortification. *And this we look upon as the immediate Cauſe of the King's Death.*

From the Ventricles of the Heart, and the greater Blood-Veſſels ariſing out of them, were taken ſeveral large, tough, Fleſh-like Subſtances, of the Kind called *Polypus*.

The Heart it ſelf was of the ſmaller Size, but firm and ſtrong.

4. Upon laying bare the Right Collar-Bone, we found it had been broken near the Shoulder, and well ſet. Some extravaſated Blood was lodg'd above and below the Fracture.

5. The Brain was perfectly ſound, and without any Sign of Diſtemper.

6. 'Tis very rare to find a Body with ſo little Blood as was ſeen in this, there being more found in his Lungs, than in all the Parts beſides put together.

Doctors preſent.
Sir *Richard Blackmore*.
Sir *Theod. Colladone*.
Doctor *Hannes*.
Doctor *Harrel*.
Doctor *How*.
Doctor *Hutton*.
Doctor *Lawrence*.
Sir *Tho. Millington*.
Profeſſor *Bidloo*, &c.

Surgeons preſent.
Mr. *Bernard*.
Mr. *Cowper*.
Mr. *Gardner*.
Mr. *Ronſiat*, &c.

Of the Parts of the Thorax, Breaſt, *or* Middle Venter. *From Mr.* Le Clerc, *Phyſician in Ordinary to the* French *King*; Phil. Verheyen, *Anatomy-Profeſſor at* Louvain; *and Mr.* St. Hilaire: *With* Laurentius Bellinus's *new Conſiderations of the Nature and Manner of Reſpiration.*

THE Breaſt is a Cavity in which the Heart and Lungs are principally contain'd. What is to be conſider'd outwardly in the Breaſt, is its Extent, and the Situation of the Parts therein. It is extended from the Clavicles to the *Xiphoide* or Sword-like Cartilage on the fore Part, and bounded on the hinder by the Twelfth *Vertebra* of the Back, having all the Ribs to form its Circumference, and the Diaphragm for its Bounds at Bottom, ſeparating it from the *Abdomen* or Lower Belly. The Parts contain'd in the Breaſt, are, firſt, the Lungs, that take up the Upper Region, and fill almoſt the whole Space, deſcending at the Diſtance of two Fingers Breadth from the Diaphragm. The Heart is ſituated in the Middle, bearing its Point ſomewhat towards the Left Side, under the Lobes of the Lungs, which are divided by the *Mediaſtinum*, that diſtinguiſhes them into the Right and Left Parts.

To anatomize or open the Breaſt, after the cutting of the five Teguments, and the Removal of the Muſcles, the Anatomiſt muſt proceed to lift up the *Sternum* or Breaſt-Bone, by ſeparating it from the Ribs: Then it is laid upon the Face, or elſe entirely taken away, to the end that the internal Parts of the Breaſt may be more clearly diſcover'd; whereupon immediately appear the Heart, the Lungs, the Diaphragm, and the *Mediaſtinum*, which adheres to the *Sternum* throughout its whole Length.

The Heart is the moſt noble Part, being the Fountain of Life, and the firſt Original of Motion of all the others; on which Account it is call'd *Primum Vivens, & Ultimum Moriens*, that is to ſay, the firſt Member that appears to live, and the laſt that dies. The Parts to be conſider'd in the Heart, are, its fleſhy Subſtance, with all its Fibres turn'd round like the Skrews of a Vice, its Baſis, Point, Auricles, Ventricles, Veſſels, *Pericardium*, and Ligatures. The Baſis is the uppermoſt and broadeſt Part; the Point is the lowermoſt and narroweſt Part: The two Auricles or ſmall Ears, being as it were little Ciſterns or Receptacles that pour the Blood by Degrees into the Heart, are ſituated on each Side above the Ventricles. The Ventricles, which are likewiſe two in Number, are certain Cavities at its Right and Left Sides. The large Veſſels are the *Aorta* or Great Artery, and the *Vena Cava*, together with the Pulmonary Artery and Vein. The *Pericardium* is a Kind of Bag fill'd with Water, wherein the Heart is kept, which is faſten'd to the *Mediaſtinum* by its *Baſis*, and to the large Veſſels that enter and go out of its Ventricles.

The Lungs are an Organ ſerving for Reſpiration, of a ſoft Subſtance, and porous as a Spunge, being all over repleniſh'd with Arteries, Veins, Nerves, and Lymphatick Veſſels, and perforated with ſmall Cartilaginous Tubes, that are imparted to it from the Windpipe, and are call'd *Bronchiæ*. Their natural Colour is a pale Red and marbled Dark-brown, and their whole Body is wrapped up in a fine ſmooth Membrane, which they receive from the *Pleura*. They are ſuſpended

pended by the Windpipe, by their proper Artery and Vein, and by the Ligatures that faſten them to the *Sternum*, *Mediaſtinum*, and frequently to the *Pleura* it ſelf. They are alſo divided into the Right and Left Parts by the *Mediaſtinum*, having four or five Lobes, whereof thoſe on the Left Side cover the Heart. Their continual Motion conſiſts in Inſpiration, to take in the Air; and Expiration, to drive it out. The *Larynx* makes the Entrance of the Windpipe into the Lungs, and the *Pharynx* that of the *Oeſophagus* and Gullet at the Bottom of the Mouth to paſs into the Stomach.

Of the Parts of the Breaſt. *From* Verheyen.

THE Middle *Venter* or Breaſt, is that Cavity that lies betwixt the Clavicles and the Diaphragm, containing the Heart, with the *Pericardium*, the Lungs, *Mediaſtinum*, Part of the Gullet and Windpipe, with their Veſſels. On the Outſide of the *Thorax* are the Breaſts, Muſcles and Bones, to which internally the *Pleura* is join'd. The Shape of the Breaſt is oblong, but much more ſo in the back Part, by reaſon of the oblique Situation of the Diaphragm. The Breaſt is ſhorter in Men than in moſt Quadrupeds, becauſe of the upright Poſition of their Bodies, ſo that the Diſtention of the Stomach and Guts does not ſo eaſily affect the free Motion of the Lungs. The Cavity of the *Thorax* is divided into a Right and Left Part by an intermediate Membrane, call'd the *Mediaſtinum*.

Beſides the common containing Parts ſpoken to, the firſt Thing that occurs to our View is the Breaſts, which we ſhall mention in the Female Sex, the other being of little Moment or Advantage in a Work of this Kind: They are therefore prominent or ſwelling Parts, like little Mountains, deſtin'd by Nature for ſeparating a milky Juice, that is elaborated and preſerv'd for the Nutrition or Subſiſtence of the Infant. See *Tab. I. Fig. I. A.* There are naturally Two, 1. That Milk might be more plentiful; 2. That one might ſupply the Want of the other; 3. To provide for two; 4. Both for Convenience and Beauty. About the Time of Puberty or Eruption of the *Menſes*, the Breaſts begin to ſwell and grow prominent, probably from a greater Afflux of Humours at that Time, which not only fill the Veſſels, but dilate the Subſtance of them; which Opinion is confirm'd by their ſhrinking when Age renders them unfit for Procreation, and their *Menſes* deſert them. The Size or Bulk is various and undeterminate, biggeſt when they are with Child or give Suck, at which Times they ſeem to be more ſpungy and compreſſible, at others plump, but firm, eſpecially in Women that have never been pregnant.

That little round Part, which has a Prominence in the Middle of the Breaſt, is called the *Papilla* or Nipple, *a. Fig. I.* which in Virgins is of a freſh red Colour, in thoſe that give Suck more livid, in Age it grows black. In the Extremity of the Nipple are divers Holes, which are the Ends of the Lacteal Tubes. The Circle about the Nipple, call'd the *Areola*, *b.* is of a different Colour from the reſt of the Skin, and is more pale in Virgins, in Nurſes and Women with Child browner, and in old People black: Notwithſtanding I have obſerv'd, ſaith *Verheyen*, that in Breeding Women the *Areola* and *Papilla* were both intenſly red.

The internal Subſtance of the Breaſts is compos'd of Glands, intermix'd with Globules and Veſſels of Fat. The Glands are of different Sizes, and whilſt Vigour laſts, look whitiſh, in Age they turn yellow. The Breaſts receive Arteries and Veins from the *Subclavian*, which run under the *Sternum*, till they come juſt under the *Mammæ*, where they paſs outwards to them: And beſides theſe, they ſend many Branches which inoſculate with other Branches of the Hypogaſtricks. There are likewiſe other Blood-Veſſels, which come to them from the Intercoſtals and Thoracicks. All the Veſſels are much larger and more conſpicuous in thoſe that give Suck than in other Women, as is manifeſt even upon external Inſpection. Their Nerves come from the Fifth Pair of the Spine, and from a *Plexus* about the Clavicles;

vicles; beſides which, there are others that have not been diſtinctly traced to their Originals, neither perhaps is it material to trace them.

Dr. *Wharton* aſſigns them a great many Lymphæducts, which upon the Udder of a Cow are very conſpicuous, but not eaſily traced déep into the Subſtance, though 'tis probable they ariſe from thence, and empty themſelves into the Thoracick Duct. Of all the Veſſels belonging to this Part, the moſt conſiderable are thoſe peculiar Ducts call'd the Lacteal Pipes, which not only perform the Office of Glands, but that of a Receptacle, preſerving what they have ſtor'd up for the Time of Suction. See *Fig. II. b, b.* Theſe Tubes are not every where of equal Capacity; but being in ſome Places more, in ſome leſs dilated, form a Sort of *Cells*, which ſeem contriv'd to hinder the ſpontaneous Efflux, and to create a Neceſſity of Sucking to fetch it out, which notwithſtanding is not always neceſſary, for the Milk will frequently run of it ſelf out of a full Breaſt that has been much ſuck'd. Beſides this Contrivance, the accurate *Nuck* has found out the *Anaſtomoſes* or Communications between theſe, that Nature has fram'd to obviate the Inconveniencies that might ariſe from any caſual Obſtructions of one or more of them.

Of the Concurrence of theſe *Tubuli* or Pipes is the Subſtance of the *Papilla* in great Meaſure form'd, amongſt which is interſpers'd a glandulous Subſtance, which ſerves to keep them from compreſſing each other; and with it are intermix'd Abundance of Fibres drawn from the external Teguments of the *Papillæ*, by Means of which the Lacteal Tubes are conſtring'd, and the Motion of the Milk is modified. Some have imagin'd particular Ducts from the Thoracick to the *Mammæ*, but in the Opinion of the moſt Judicious, without any Occaſion; and 'tis probable, that theſe Ducts never had any Exiſtence but in the Imagination of fanciful Men. Beſides theſe Veſſels, there are Abundance of fatty Globules, which ſome would have only to ſerve to fill up the Interſtices of the Glands, and to keep them moiſt; but *Malpighius* thinks that they have a much nobler Uſe.

As the Parts have been already conſider'd from *Liſerus*'s *Culter Anatomicus* in the opening of the *Thorax*, to wit, the *Cuticula*, *Cutis*, *Membrana Adipoſa*, *Pinguedo*, *&c.* with the Pectoral and Intercoſtal Muſcles, I ſhall proceed to the Diaphragm, which is a muſculous broad expanded Part, appointed for Reſpiration, and to diſtinguiſh the Middle *Venter* from the Lower. See *Fig. I. D, D.* as likewiſe all *Fig. V.* It is ſituated obliquely, being on the fore Part join'd to the *Sternum* and Ribs, and on the hinder to the *Vertebræ* of the Loins, which renders its Poſition ſomething ſlanting. Its Figure is almoſt circular, varying only ſo much from it, as the Figure of the Cavity of the Body in that Part, and its two Proceſſes, which it ſends to the *Vertebræ* of the Loins, unavoidably occaſion it to do.

It conſiſts of two Muſcles, or as ſome will have it, three, and perhaps not in the wrong. The foremoſt of the two is thin and broad, extended from the *Sternum* on each Side to the Baſtard Ribs and *Vertebræ*: The hinder is thick, and has a very fleſhy Belly. It ariſes from the *Vertebræ* of the Back by two Proceſſes, which give Room for the Diviſion of it into two Muſcles. The Right, which is the longeſt, ſprings with a triple Tendon from the two or three Firſt *Vertebræ* of the Loins, and the Laſt of the Back. The Left, which is ſhorter, and ſometimes ſingle, ſometimes double, ariſes from the Laſt of the *Back*, and the Firſt of the *Loins*, and ſometimes from one only of them. Theſe Originations, when nearly inſpected, appear to be *Tendinous*. The Tails of theſe Muſcles end in a Tendinous Center, which is perforated towards the Left backwards. Its fleſhy Part gives Way to the *Gula*. The Deſcending Trunk of the Great Artery, Thoracick Duct, and *Vena Azygos*, paſs between its two inferior Proceſſes.

The Veins of the Diaphragm are pretty large, and go directly to the *Cava* between its Entrance into the *Thorax* and the Liver, where two pretty large Branches from each Side of the Diaphragm enter it. It has Arteries immediately from the *Aorta*, ſometimes from the Cæliack, and a few ſmall Twigs from the *Lumbals* and *Adipoſe*. This Author *Verheyen* mentions two Arteries and two Veins of his own Diſcovery, whereof the Right Artery and the two Veins are Branches of the Subclavians. The Left he dares not

not pretend to have ſufficiently traced, but ſays, that in the Diaphragm the Arteries and Veins inoſculate with the aforemention'd of their Kind, and that the Veins receive ſome Branches in their Return from the Diaphragm, the *Pericardium*, and *Mediaſtinum*. It receives a pretty large *Nerve* from the *Plexus Cervicalis* on each Side, and from the Second Pair of the *Vertebræ*, which from a triple Root form a conſiderable Branch, that diſtributes it ſelf on each Side through the whole Body of the *Diaphragm*.

In Inſpiration, the *Diaphragm* deſcends towards the *Abdomen*, which is its proper Motion, which, as a Muſcle, is contracted. In Expiration, it is relax'd, and with the *Coſtæ* drawn upwards, and makes a concave convex Figure, the concave Side towards the *Abdomen*. By this Alteration of Poſture, it enlarges the Cavity of the *Thorax* in Inſpiration, of the *Abdomen* in Expiration. By this reciprocal alternative Motion, it ſerves as well to draw down the Ribs, and enlarge the *Thorax*, as to compreſs the *Abdomen*, and that Way to aſſiſt to the Expulſion of the Contents of the Stomach and Inteſtines, and to the Excluſion of the *Fœtus* in the Birth.

Of the Pleura *and* Mediaſtinum, *with their Veſſels, Nerves, and Lymphæducts. From the ſame Author.*

THE *Pleura* is a Membrane that lines the inward Cavity of the *Thorax*. See *Tab. II. Fig. II.* It is double, and conſiſts of two *Lamellæ*, the internal of which, that is towards the Cavity of the Breaſt, has a concave, light and ſmooth Superficies, leſt the Lungs ſhould preſs hard upon it. The external is join'd to the Ribs and Intercoſtal Muſcles, and towards the End has a convex, ſharp and uneven Superficies. Between the Duplicatures of this Membrane paſs the *Vena Azygos* and the Intercoſtal Arteries and Nerves.

It has ſeveral viſible *Foramina*, the lower of which anſwer to the ſuperior *Foramina* of the *Peritonæum*, *viz.* for the Paſſage of the *Gullet*, the *Vena Cava*, and Nerves of the *Par Vagum*. The ſuperior are thoſe that give Paſſage to the *Oeſophagus*, the *Aſperia Arteria*, *Aorta*, and Upper *Vena Cava*. It has Arteries and Veins from the Intercoſtals, and likewiſe Nerves from thence, and from the Diaphragm.

Out of a Duplicature of this is form'd the *Mediaſtinum*, which divides the *Thorax* lengthways, including betwixt its two *Lamellæ* the Heart, and affording Paſſage to the *Oeſophagus*, *Vena Cava*, and Stomachick Nerves. It has Arteries and Veins from the *Mammaries* and ſuperior Diaphragmaticks, and ſome Branches immediately from the great Arteries and Vein, which have been call'd the *Mediaſtina*, as proper to it. Its Nerves come from the Stomachicks and Diaphragmaticks, which in their Paſſage through it beſtow ſome Branches upon it. It has Lymphaticks, which tend to the Thoracick Duct. But of this more when we ſpeak of the *Pericardium*.

Of the Thymus *Gland.*

THE *Thymus* is a conglomerate Gland, ſeated in the upper Part of the Breaſt, juſt below the Subclavian, and from thence extended to the *Pericardium*. See *Tab. II. Fig. II. D.* But if you would ſee the Diviſions of the Subclavian and Carotide Arteries, you muſt remove the *Thymus*. It receives Arteries and Veins from the Carotides and Jugulars, and Nerves from the *Par Vagum*. Over the Surface run divers Lymphaticks; but whether they come from the internal Subſtance of it, is not quite ſo plain in Fact, as it may appear reaſonable. It is often found with a milky Juice in new born Children. Its Lymphæducts have no Valves in them; for by injecting a Liquid into the *Ductus Thoracicus*, it will paſs into the Lymphæducts of the *Thymus*. The like has been ob-

obſerv'd by injecting Wax. The *Thymus* has been therefore thought to be a Kind of *Diverticulum* to the Chyle in the *Thoracick Duct* when overcharg'd, as well as to receive the *Lympha* from the adjacent Parts, in order to tranſmit it to the Thoracick Duct. The Cavity in the *Thorax* of a *Fœtus* muſt be very much crowded when the Lungs become diſtended by Reſpiration; whence it is that the neighbouring Lymphatick Glands, as thoſe about the Throat, are larger in *Adults*, when the *Thymus* is leſs; and on the contrary, leſs in the *Fœtus* in Proportion, when the *Thymus* is largeſt. Its Uſe is very uncertain, and like to continue ſo as long as the Excretory Duct remains unknown, tho' undoubtedly there is a Separation of ſome Liquor made in it, as in other Glands; but ſince we know not what it is, or to what it is converted, we cannot therefore aſſign any peculiar Uſe to this Part.

Of the Pericardium, *and the* Heart. *From the ſame Author.*

THE *Pericardium* is a Membrane that immediately incloſes the Heart, and is like a *Capſula* or *Pouch* for it. See *Tab. II. Fig. II. A.* It conſiſts of a double Membrane, the inner ariſing from the Tunicks of the Veſſels of the Heart, and the outer from the *Mediaſtinum*. Its Figure is like a Cone, conformable to that of the Heart, and ſurrounds the Heart looſely, that it may have Liberty to play or perform its Pulſation. In Humane Bodies, and in them only, it is join'd below to the Tendinous Part or Center of the Diaphragm, whereas in Brutes it is looſe. Externally it adheres to the *Mediaſtinum*, and in the upper Part to the Veins and Arteries of the Heart, for the Paſſage of which it has ſeveral Perforations. It receives Arteries and Veins from the *Mediaſtins*, and from the ſuperior Diaphragmaticks, in the upper Part, and in the lower from the Phrenick. Its Nerves come from the neighbouring Branches of the *Par Vagum*; and it has likewiſe ſome Lymphaticks which empty themſelves into the *Thoracick Duct*. Its Uſe is ſuppos'd to be the Defence of the Heart, as likewiſe to contain a ſoft ſerous Humour, which may ſerve to lubricate and moiſten it. This latter Opinion has been controverted by ſome, who think that this Water is not naturally there, but that it is ſeparated forcibly during thoſe Convulſive Agonies which uſually attend the Pangs of Death.

This Opinion is grounded on the Difficulty that Anatomiſts have met in tracing its Paſſage; for it does not yet plainly appear which Way it comes, nor how it is carried off; and it is hard to imagine that the Quantity always remains the ſame, or that it could do ſo without Putrefaction; yet the Paſſages through which it ſhould be ſhifted not being demonſtratively diſcover'd, I muſt be contented, ſays the Author, to leave it as I find it, *ſub Judice Litem.* The Doubt has been as great likewiſe whence this Humour was ſeparated. The moſt recent Opinion, and moſt probable, is, that it is ſecreted by ſome Glands about the Baſis of the Heart. However, it ſeems to me to be neceſſary by its Lubrication to prevent any Inflammation that might probably ariſe from the dry Friction of the Heart and its *Capſula.*

Of the Heart. *From the ſame Author.*

THE Heart is a muſculous Part, ſeated betwixt the two Lobes of the Lungs in the Midſt of the Breaſt, receiving the Blood into its Cavities by a reciprocal Dilatation and Conſtriction through the Veins from all Parts of the Body, and pulſing it out again by the Arteries to all Parts. See *Tab. II. Fig. III. A, B.* The Figure of the Heart it ſelf is that of a Cone or Pyramid revers'd; the upper and broader Part of which is called the Baſis, and the lower the Cone or Point. Its Magnitude is indeterminate, and dif-

differing in ſeveral Subjects according to their reſpective Dimenſions. However, its ordinary Length is about ſix Inches, and its Breadth at the Baſis betwixt four and five, and the whole Circumference about fourteen. It is ſituated in the Middle of the *Thorax*, and is faſtened to the *Mediaſtinum* and *Pericardium*, and ſupported by the great Blood-Veſſels, to which alone it is immediately connected, being for the Convenience of its Motion diſengag'd from any other Impediments. It is cover'd with a thin Membrane, which about the *Baſis* is guarded with Fat. It has two great Cavities or Ventricles of ſomewhat unequal Capacities, the Right being of the two the larger, and capable of containing between two and three Ounces of Blood, the Left not containing ſo much by about half an Ounce. See *Tab.* II. *Fig.* IV. *A. C.*

The Ventricles are divided by a thick fleſhy Partition, conſiſting of the ſame muſcular Fibres that the *Parietes* of it do, and is called the *Septum*, the Figure of which is concave towards the Left Ventricle, and convex towards the Right. Between theſe Ventricles there is no immediate Communication; but the Blood circulates through the Lungs to arrive at one Ventricle from the other. The *Parietes* or Sides of theſe Ventricles are of a Thickneſs and Strength very unequal, the Left being much thicker than the Right becauſe of its Office, which is to force the Blood through all Parts of the Body; whereas the Right drives it through the Lungs only, and is therein greatly aſſiſted otherwiſe.

In theſe *Ventricles* are divers ſmall Muſcles deriv'd, and as it were detach'd, from the *Parietes* of the *Ventricles*, and united by tendinous Extremities to the Valves of the Heart, and are by Authors variouſly called *Columnæ*, *Carneæ*, *Lacertuli*, *&c.* and theſe little Muſcles being faſtened to the Sides of the Heart on one Side, and the Tricuſpid and Mitral Valves on the other, do by their Contraction in the *Syſtole* of the Heart draw out the Valves, and by that Means not only ſhut up the Orifices of the Veins, but, as Mr. *Cowper* obſerv'd, more exactly cloſe the Ventricles in their *Syſtole*, than they could have been, had they been ſmooth. Theſe *Ventricles* are cap'd or cover'd each with an *Auricle*: Theſe *Auricles* are two Muſcles, conſiſting of a double Order of fleſhy Fibres, as the Ventricles of the Heart themſelves do, whoſe Proportion they ſeem exactly to follow, both as to Strength and Capacity, and in the Tendons of which they terminate. Theſe *Auricles* are mov'd regularly, after the Manner of the Heart, the Order only revers'd; that is, they are contracted whilſt the Heart is dilated, and dilated whilſt the Heart is contracted. Thoſe Veſſels which proceed from and terminate in the Heart and its Auricles, are two Arteries, the *Aorta* and the Pulmonary Artery, *Fig.* III. *G. I.* which have their Origination from the Ventricles of the Heart, the *Aorta* from the Left, and the Pulmonary from the Right; and two Veins which terminate in the Auricles of the *Cava*, or great Vein in the Right, and the Pulmonary Vein in the Left.

At the reſpective Orifices of theſe Veſſels are placed Valves. *Tab.* II. *Fig.* IV. *a*, *a*. *b*, *b*. At the Orifice of the Arteries, within each Artery, are fix'd three ſemilunar Valves, *Fig.* V. *C*, *C*, *C*. that is three Membranes of a ſemilunar Figure, which being expanded cloſe the Orifice of the Artery, hinder the Relapſe of the Blood into the Heart at the Time of its Dilatation. At the Mouth of the Right Ventricle of the Heart, juſt at its Juncture with the Auricle, are placed three Valves called Tricuſpides, from their having three Points, which are faſtened by tendinous Fibres to the *Columnæ Carneæ*. *Tab.* III. *Fig.* II. *e*, *e*. and upon the Contraction or Syſtole of the Heart cloſe the Orifice of it, and hinder the Blood from recurring into the great Vein. The ſame Office the *Valvulæ Mitrales* do at the Exit of the Left Ventricle, ſtopping the Return of the Blood into the Pulmonary Vein.

The Subſtance of the Heart it ſelf is entirely fleſhy or tendinous, conſiſting of a continued Series of muſcular Fibres, variouſly contorted or wound up, and ending at the Orifices of the reſpective Ventricles, and there forming the Tendons, by which Means they make the Heart a double Muſcle, or as ſome think two Muſcles. As ſoon as the proper Membrane is taken off, there appear on the outward Surface, on the Right Ventricle, ſome ſlender ſtrait Fibres, tending

to, and ending in the Baſis. *Tab.* III. *Fig.* VI. Immediately under theſe, lies a double Order of ſpiral Fibres. *Fig.* VII. The exterior Order of theſe aſcend obliquely from the *Septum Cordis* to the Baſis, forming thereby a Sort of *Hælix* or *Cochlea*. The interior Order takes a Courſe juſt contrary to thoſe which they lie under, and ſpringing from the Right Side, wind obliquely towards the Left, encompaſſing both Ventricles, and ending in the *Baſis* on the Left Side, and ſo forming a *Hælix* of an inverſe Order.

Theſe Fibres are beſt diſcern'd in the unravelling a Sheep's or Ox's Heart, after they have been well boil'd; in which, as ſoon as the Membrane of the Heart is taken off, the firſt Order readily appears, the Fibres of which do not all of them reach from the *Baſis* to the *Cone*; but ſome of them taking a much ſhorter Turn, as ſoon as they have meaſur'd about half the Circumference of the Heart, turning about with a kind of Arch go with an oblique Courſe to the Tendon of the other Side and Ventricle. See *Tab.* III. *Fig.* X.

After theſe Fibres are remov'd, thoſe of the Left *Ventricle* appear. *Tab.* III. *Fig.* I. among which there are no ſtrait ones, but firſt appears a Series of Fibres running ſpirally to the Left, under which, as in the Right *Ventricle*, lie another Order, running juſt the contrary Way. Theſe Fibres do not within the Right Ventricle extend only to the outward *Paries*, but encompaſſing the whole *Ventricle*, make the *Septum* appertain peculiarly to the Left *Ventricle*. Many of theſe Fibres, inſtead of terminating as the reſt do in the Tendons of the Heart, run inwards, and form the *Columnæ Carneæ*, of which we have ſpoken before. Others reaching down to the *Cone*, are wound about it, and form that Circle which is called the Centre. See *Tab.* III. *Fig.* VIII.

The Structure of the Auricles is ſo like that of the Heart it ſelf, as may be ſeen *Tab.* III. and IV. *Fig.* II. and III. that it needs no particular Deſcription. The Heart has its proper Veſſels, two Arteries ſpringing from the Entrance of the *Aorta*, and one larger Vein, with one or two leſſer; all which, from their encompaſſing the Heart, are called *Coronariæ*. See *Tab.* IV. *Fig.* I. and II. As likewiſe *Fig.* III. where the Right *Ventricle* and Auricle are open'd with the ſuperior *Vena Cava*, ſo that the late diſcovered Paſſages may be ſeen. The Nerves of the Heart and its *Auricles* come from a *Plexus* of the *Par Vagum*, ſeated in the Breaſt, a little above the Heart, and called *Willis's Plexus Cardiacus*. It has ſome *Lymphæducts* which carry the *Lympha* from the Heart to the *Thoracick Duct*.

The Uſe of the Heart and its *Auricles*, is to circulate the Blood through the whole Body, and their Motion is alternate, or oppoſite to each other; the Auricles being dilated to receive the refluent Blood, whilſt the Heart is contracted, and contracted whilſt the Heart is dilated, to drive the Blood into it. By Means of the Right *Ventricle* the Blood is driven through the Pulmonary Artery into the Lungs, and by the Pulmonary Vein is returned again to the Left Ventricle, from whence through the *Arteria Aorta* it is diſtributed all over the reſt of the Body, and thence returned again to the Right Ventricle by the *Vena Cava*; ſo making an entire Circulation through the whole Body. Thus through the *Aorta* and *Cava* being a longer Circuit than that through the Lungs, a greater Force is neceſſary to perform it; and therefore it is that the Sides of the Left Ventricle are by Nature made much ſtronger than that of the Right.

Of the Aſpera Arteria, *and Lungs. From* Willis, Verheyen, Drake, Cowper, &c.

THE *Aſpera Arteria*, *Trachea*, or Wind-pipe, is a long fiſtulous Tube, compos'd of ſeveral Cartilages and Membranes, deſcending from the *Fauces* into the Lungs, and diſtributed by infinite Ramifications thro' the Subſtance of them, giving free Paſſage for Inſpiration and Expiration of Air. See *Tab.* V. *Fig.* VIII. *A. B.* It runs along the fore Part of the *Oeſophagus*, as far as the fourth *Vertebræ* of the *Thorax*, where it is divided into two principal Branches, which are beſtow'd on the Lobes of the Lungs on each Side; and theſe again are innumerably ramify'd, ſending a ſmall Twig to every *Veſicle* of which the Subſtance of the Lungs is compos'd, as at *C, C.* The upper Part or Head of it, *D.* is compos'd of five Cartilages of different Figures and Names. The biggeſt of theſe is that which guards the fore Part of it, and from the Form of a Shield, which fanciful Men reſemble it to, has been called *Thyroides*, and *Scutiformis*. It is of a *concave, convex*, ſquare Figure, the hollow Part being inward, and the gibbous outward, having a little Prominence in the Middle called *Pomum Adami*. It has four Proceſſes, at each Corner one; of which the two upper are the longer, and tie it by Means of a nervous Ligament to the under Part of the *Os Hyoides* on each Side; the lower and ſhorter connect it to the ſecond Cartilage, *F.* called *Cricoides*, or *Annularis*, from its Figure, which is like a Turkiſh Ring. The fore Part of this is very narrow, coming under the former Cartilage, but behind it is broad, thick and ſtrong, and is as it were the Baſis of all the other.

The third and fourth are called *Arytænoides*, or *Guttales*, from the Figure of an Ewer, which theſe two Cartilages joining together ſomewhat reſemble. At the Junćture of theſe two on the upper Part of the *Larynx*, is a Chink bearing the Form of a little Tongue, and therefore called *Glottis*, or *Lingula*. Through this Chink the Air deſcends into the Lungs, and the pituitous Matter which is ejected by Coughing in *Catarrhs* is let out.

Over this Chink lies a fifth Cartilage called the *Epiglottis*, which is a thin ſoft Cartilage, and in young Perſons almoſt membranous, of a Figure near triangular, concave on the under Side, and convex on the upper. Its *Baſis* is faſten'd to the *Thyroide* Cartilage, and its Point looſe, that it may open and ſhut with the more Eaſe. This Cartilage defends the Entrance of the *Trachea*, and hinders the Liquids which in drinking ſlip over into the Gullet, from falling into the *Trachea* or Wind-pipe. On the gibbous Part, or Back of the *Epiglottis*, lies a little Caruncle, or rather Gland, covered with Fat. The concave Part of it is beſet with divers ſmall Glands, which ſerve to moiſten it, and perhaps the *Trachea* likewiſe.

Near the *Larynx* are ſituated four pretty large Glands; two of which called the Almonds, ſhall be accounted for among the Glands of the Mouth; the other two lie at the Sides of the lower Cartilage of the *Larynx*, and are called *Glandulæ Thyroideæ*, which have no excretory Duct as yet diſcovered belonging to them, but are looked on to be of the ſame Kind with the *Thymus*, and diſcharge their *Lympha* into the *Thoracick Duct*. Theſe Cartilages of the *Larynx* are moved by ſeven Pair of Muſcles, two Pair of which are common, the other five proper. The proper Muſcles are thoſe which have both Origination and Inſertion into the *Larynx*, the common which have only their Inſertion there.

Verheyen, not content with this Diviſion as juſt and inſtructive, divides them into external and internal, of which the internal are the ſame with the common, b[illegible] ated upon and on the Outſide o[f] , which he calls internal, and are [illegible]ne with the proper in the vulgar L[illegible]ion.

Theſe Muſcles have compound *Greek* Names, which intimates both their Origination and Inſertion. The firſt common or external Pair is called *Sterno-thyroides*, having its Head in the *Os Sternum* or Breaſt-Bone, and its Tail in the Thyroide Cartilage, and ſerves to draw down that Cartilage. The ſecond Pair is Antagoniſt to the former, its Head is in the *Os Hyoides*, and the Tail on the *Thyroide Cartilage*, ſerving to lift up that, and is called *Hyothyroides*.

The firſt internal Pair riſes from the annular Cartilage, and aſcending obliquely on the hinder Part, is inſerted into the Side of the *Thyroide*, and is called *Cricothyroides*. This Muſcle dilates the *Scutiform Cartilage*. The ſecond internal Pair ariſes from the back Part of the annular Cartilage, and terminates in the *Arytænoide Cartilage*, and by its Action draws back that Cartilage, and opens the *Rima*, and is called *Cricoarytænoides Poſticum*. The third has its Head in one of the *Arytenoide* Cartilages, and its Tail in the other, and ſerves to bring them together, and ſhut the *Rima*, and is called ſimply *Arytænoides*. The fourth Pair ariſes from the Side of the *annular Cartilage*, and is inſerted on the lower Part of the *Arytænoides* of the ſame Side. It ſerves to open the *Rima*, and is called *Cricoarytænoides Lateral*. The fifth and laſt Pair is the *Thyroarytænoides*, ſituate under the *Cartilago Thyroides*, from the fore and back Part of which it proceeds with a very broad Head, and ends in the *Arytenoides*, which it conſtringes, and ſhuts the *Larynx*.

The Trunk of the *Aſpera Arteria*, which is continued from the *Larynx*, conſiſts of *Cartilages* making an imperfect Circle, clos'd on the hinder Part by a Membrane, leſt the Stiffneſs and Reſiſtance of the Cartilages preſſing upon the *Oeſophagus*, might hinder Deglutition. Theſe Cartilages are, from the *Annularis* to the Diviſion, in Number about twenty, join'd together on the back Part by a ſtrong fleſhy Membrane, which upon the Cartilages themſelves is more tendinous, and in that Part not continuous, but interrupted by the Interpoſition of the Cartilages themſelves. It conſiſts of tranſverſe Fibres approaching a circular Figure.

The Inſide of the *Trachea* is lined with a Membrane which is continued down to its ſmalleſt Ramifications. This is thinner than the former, and conſiſts of longitudinal Fibres interſecting thoſe of the other at Right Angles. Theſe Fibres do not all of them reach the whole Length of the Air-pipe, but ſome of them terminate ſhort in the intermediate Cartilages, others ariſe from them, and are continued downwards. This Tunick is thought to be acutely ſenſible, and to be the Occaſion, that the leaſt Crum of any Solid, or Drop of Fluid, ſlipping into the *Trachea*, raiſes a Kind of Convulſive Cough. *Verheyen* thinks that this Tunick is cloathed with another nervous Membrane, to which he chooſes to aſcribe this acute Senſe. Between the Two Tunicks lie a Multitude of ſmall Veſſels, and very minute Glands, to each of which *Willis* allows a particular Membrane, calling one the glandulous, the other the vaſculous Coat. Beſides theſe, it has another outward looſe Coat, which is diviſible into ſeveral *Lamellæ*, and abounds with Blood Veſſels. By Means of this Coat it is connected to the *Oeſophagus* and other adjacent Parts.

Verheyen has diſcovered another Sort of Glands found generally about the *Bronchia* or Diviſions of the *Aſpera Arteria*, eſpecially about the larger Branches of it; to which they adhere cloſely in pretty good Number, tho' he has found 'em ſometimes at ſome Diſtance from them, with a large Branch of the *Pulmonary Artery* between them; and of theſe he has obſerv'd ſo many, that he doubts whether there be any conſiderable Ramifications of the *Bronchia* without 'em; for he ſays, he has counted an Hundred or more in one Subject. Theſe Glands he affirms to differ in Magnitude, thoſe that lie neareſt to the firſt and great Diviſions being the largeſt, exceeding ſometimes in Bulk a Hazel Nut; and tho' he has ſometimes obſerv'd thoſe which adhere to the lower Branches to be bigger than thoſe above, yet he ſuſpects them to be in a preternatural Condition. Their Subſtance is naturally ſoft and ſucculent, cover'd with a common Membrane, and in Colour blackiſh. Their Figure is various and irregular, ſome being almoſt oval, and others longer, and ſhap'd more like a Raiſin, ſome triangular, *&c.* but the Surface of all is ſmooth enough to intitle 'em to the Name of Conglobate Glands.

They

They receive Arteries and Veins from the *Pulmonaries* for their common Uſe, and for their proper Nouriſhment from their *Bronchials*; their Nerves from the *Par Vagum*, eſpecially the *Cardiack Plexus*. He confeſſes not yet to have ſeen their Excretory Ducts, but imagines them to be very ſhort, and to reach only from the Glands to the inward Surface of the *Bronchia*. Their Uſe he ſuppoſes to be to ſeparate that unctuous Humour with which the Inſide of the *Bronchia* is lin'd, and thereby to defend it from the Injuries which a cold, harſh, dry Air might otherwiſe ſubject the Lungs to; and he thinks, that the Hoarſeneſs which ariſes from a Cold taken, may proceed from an Obſtruction of theſe Glands, and that the Benefit which accrues from the taking Oil of Almonds, or other ſlippery ſmooth Medicaments, may proceed from their ſupplying the Defect of their Juice, and artificially lubricating the Inſide of the *Bronchia*. But it is well known that the [illegible]*liary Glands* of the Windpipe and *Bronchia* ſupply that Humidity which moiſtens their Inſides, and theſe are only Lymphatick Glands, that become tumid in morbid Caſes, inſomuch that they often preſs the Windpipe, or ſome of its Branches, before they enter the Lungs, and render the Patient *Aſthmatick*, which often proves fatal. Theſe Glands are ſcarce viſible in a *Fœtus*.

The *Trachea* has Arteries from the *Carotides* and from the *Bronchials*, and ſends Veins to the External Jugular. Theſe Veſſels accompany it through its whole Diſtribution. The Lungs, which are the immediate Organ of Reſpiration, conſiſt of Veſſels and membranous Veſicles. They are connected above to the *Fauces* by Means of the *Trachea*, and below to the *Vertebræ* of the *Thorax*, and to the *Sternum* and *Diaphragm*, by Means of the *Pleura*. They are divided into two great Lobes, and thoſe again into others leſſer, the Right ſometimes into three or four, by Means of ſome Fiſſures running from the fore to the back Edge. The great Lobes, when inflated or blown up, reſemble each of them a Horſe's Hoof in Shape; but together, they are like an Ox's Hoof inverted. See *Tab. V. Fig. I. I. K.*

The Subſtance of the Lungs is membranous, conſiſting chiefly of innumerable Cells or Veſicles, which ſeem to be nothing but Expanſions of the Membranes of the *Bronchia*, to which they hang like Grapes in Cluſters, ſo that by blowing into one of the Branches of the *Bronchia*, theſe Cells or Veſicles which belong to it, will be blown up, the reſt which do not, remaining ſtill flaccid and unalter'd. Theſe Cluſters of Veſicles or Cells are call'd the Internal Lobules, by which Names they are diſtinguiſh'd from the leſſer Lobes ſpoken of. Theſe Lobules are ſeparated from one another by Interſtices, which receive the Veſſels, and are fill'd up with Membranes propagated from the Lobules, and lying ſome parallel, ſome angular. Theſe Lobules diſcover and diſplay themſelves very exactly, if the larger Trunks of the *Bronchia* being laid open, the leſſer be blown into, by which Means every Lobule belonging to that Branch will be inflated, and riſe very diſtinctly and ſhew its Extent.

The whole *Parenchyma* of the Lungs is cover'd with a common Membrane, which is diviſible into two Coats, the outer thin, ſmooth and nervous; the inner ſomewhat thicker and rougher, conſiſting moſtly of the Extremities of Veſſels and Veſicles, thro' the Impreſſion of which it is pitted, and reſembles in ſome Meaſure a Honeycomb. Some affirm, that there are in this Coat Abundance of Perforations or Pores, ſo diſpos'd, that they readily imbibe any Humidity from the Cavity of the *Thorax*, but ſuffer nothing to eſcape into it. But this ſeems to be a Fancy grounded upon no juſtifiable Obſervation. Its Veſſels are the *Bronchia*, the Pulmonary and Bronchial Arteries and Veins, Nerves and Lymphaticks. Of theſe Veſſels, ſome are proper, ſome common, in reſpect to the Service they are of to the reſt of the Body. The common are the *Bronchia*, the *Pulmonary Artery* and *Vein*, the *Nerves*, and the *Lymphaticks*: The proper are the *Bronchial Artery* and *Vein*.

The *Trachea*, juſt before it enters the Lungs, divides it ſelf into two Branches, ſending to each Lobe one, which are again divided into innumerable Ramifications, which are call'd *Bronchia*. See *Tab. V. Fig. I. C, C.* The *Bronchia*, and their Branches, conſiſt of Cartilages like the *Trachea*; only here the

the Cartilages are perfectly circular, without any membranous hinder Part, of which, having left the *Oeſophagus*, they have no need. Theſe circular Cartilages are join'd together by the Membranes that inveſt them, and are capable of being ſhot out into Length upon Inſpiration, and of ſhrinking up and running into one another in Expiration, when the Cavity of the *Thorax* is leſſen'd. They ſend their little Ramifications to all the ſmall Veſicles of the Lungs. Along with theſe Air Veſſels run the Branches of the *Pulmonary Artery* and *Vein*, ſending their Ramifications exactly along with the other, the Artery bringing the Blood from the Right Ventricle, and the Vein carrying it back to the Left Ventricle of the Heart. Whether the Blood returns by the Vein impregnated with Air in the Lungs, is a Queſtion, of which I ſhall take Occaſion to ſpeak more hereafter.

The *Bronchial Artery* ariſes from the hinder Part of the *Aorta*, a little above the Baſis of the Heart, where turning off to the Right, it embraces the *Trachea*, and after ſending off a Branch or two to the *Oeſophagus*, it purſues the Courſe of the *Bronchia*, accompanying all their Branches through their whole Progreſs. This Artery is ſometimes ſingle; but oftner there are two of them, and ſometimes three, which riſe at about a Finger's Breadth, or leſs Diſtance from one another. Concomitant to theſe Arteries is a Vein, whoſe Branches ariſe from the Ramifications of the Capillary Arteries. Whether the Blood returns by one or more Trunks, is not yet ſufficiently apparent. Theſe Veſſels bring Blood for the Nutrition of the *Bronchia* and *Veſicles* of the *Lungs*, and carry it back again. Through the Lungs are diſtributed a great Number of Lymphaticks, attending generally the Blood-Veſſels, and being at length collected, empty themſelves into the *Thoracick Duct*. Dr. *Willis*, contrary to the vulgar Opinion, aſcribes to the Lungs a great Number of Nerves, which come from the Trunk of the *Par Vagum*, which being diſtributed through the Subſtance of the Lungs, embrace the aerious and ſanguiferous Veſſels.

Of the Motion of the Heart, *and the Uſe of* Reſpiration. *From* Borellus, Thurſton, Mayow, Steno, Lower, Baglivy, Lauzon, Drake, Cowper, *&c.*

THough divers accurate Treatiſes of the Heart, and its Action, have been written by Learned Men of ſeveral Nations, eſpecially by two of our own Countrymen, the Great *Harvey*, to whom late Poſterity will be indebted for his happy Diſcovery of the *Circulation*; and the Incomparable *Lower*, to whom we are beholding for his accurate and ingenious Treatiſe of the Heart, *&c.* Yet there remains (ſays Dr. *Drake*) ſeveral Doubts and Difficulties about it, in my Opinion, not ſufficiently accounted for; towards the reſolving ſome of which (continues he) I ſhall offer what my own Thoughts have ſuggeſted to me.

The Learned *Lower* has ſo well accounted for the *Syſtole* or Contraction of the Heart from the Mechanical Structure of it, that he ſeems almoſt to have exhauſted the Subject; and had he been as happy in diſcovering the true Cauſe of the *Diaſtole*, he had left little Room for the Induſtry and Sagacity of others about this *Viſcus*. But having judiciouſly and ſolidly explain'd the *Syſtole*, he contents himſelf to aſcribe the *Diaſtole* to a Motion of Reſtitution, which Account, to a diligent Inquirer, can give but little or no Satisfaction, be-

becauſe the *Syſtole* being the proper, and, as *Lower* himſelf confeſſes, the only Motion of the Heart, a State of *Contraction* ſeems to be the natural State, and conſequently without external Violence it ſhould have no *Diaſtole* at all.

This will appear plainer, if we conſider the Circumſtances of it, and its Motion as a Muſcle, with reſpect to other Muſcles. That *Contraction* is the proper Action and State of all Muſcles, is evident from Experience as well as Reaſon: For if any Muſcle be freed from the Power of its Antagoniſt, it is immediately contracted, and is not by any Action of the Will or Spirits to be reduced to a State of *Dilatation*. Thus if the *Muſculi Flexores* of any Joint be divided, the *Extenſores* of that Joint being by that Means freed from the contrary Action of their Antagoniſt, that Joint is immediately extended without any Conſent of the Will, and in that State it remains; and ſo *Vice verſa*, if the *Extenſores* be divided. From whence it is plain, that the Muſcles have no *Reſtitutive* Motion, but what they derive from the Action of their *Antagoniſts*, by which they are ballanc'd. Thus the *Sphincters* of the *Gula*, *Anus* and *Veſica*, having no proper *Antagoniſts*, are always in a State of Contraction, and ſuffer nothing to paſs them, but what is forc'd through them by the contrary Action of ſome ſtronger Muſcles, which, though not proper to be call'd *Antagoniſts*, yet on all neceſſary Occaſions perform the Office of ſuch.

That the Heart is a Muſcle, furniſh'd and inſtructed for Motion like other Muſcles, appears to be demonſtrated beyond Contradiction by *Lower* and others; and as it is a Solitary Muſcle, without any proper Antagoniſt, and not directly under the Power of the Will, not exerciſing voluntary Motion, it approaches neareſt to the Sphincter Kind, which only has theſe Conditions in common with it; but in conſtant and regular Alternations of Contraction and Dilatation, it differs exceedingly from all the Muſcles of the Body. The reciprocal *Æſtus* or Heat of the Heart has given the Learned Abundance of Trouble, who finding nothing peculiar in the Structure which ſhould neceſſarily occaſion it, nor any *Antagoniſt* whoſe Reaction ſhould produce it, have been extremely perplex'd to find out the Cauſe of it. But paſſing over the various Opinions of Authors, we ſhall only take Notice of *Lower*'s, whoſe Account of the *Syſtole*, however accurate and ingenious, appears ſomething deficient, and whoſe *Hypotheſis* of the *Diaſtole* ſeems to be precarious and falſe. That Excellent Author having, by ſolid Arguments drawn from the Structure and Mechaniſm of the Heart, eſtabliſh'd the Certainty of its Muſcular Motion, was ſatisfy'd, without taking Notice of any Aſſiſtance that the Heart receives from any other Part, except from the Brain by Means of the Eighth Pair of Nerves.

The Accurate *Borellus*, in his *Oeconomia Animalis*, computes the motive Power of the Machine of the Heart to be equal to, or ſurmount, that of a Weight of 3000 lb. The *Obſtacles* to the Motion of the Blood through the Arteries, he eſteems equivalent to 180000 lb. which is 60 times as much as he rates the Force of the Heart at. Then deducting 45000 lb. for the adventitious Help of the Muſcular Elaſtick Coat of the Arteries, he leaves the Heart with a Force of 3000 lb. to overcome a Reſiſtance of 135000 lb. that is, with one to remove 45. This ſtupendous Effect he contents himſelf to aſcribe to the Energy of *Percuſſion*; but had he proceeded with his Calculation to the Veins, which he allows to contain conſtantly a Quantity of Blood quadruple to the Contents of the Arteries, and to which this Energy of Percuſſion does either not reach at all, or but very languidly, he might probably have ſeen a Neceſſity for ſome other Expedient to remove ſo inſuperable a Difficulty.

But not to inſiſt rigorouſly on the Exactneſs of this Calculation, though the great Abilities of the Author in this Way, and his Ingenuity and Modeſty, are a ſufficient Warrant for the Accuracy of his Computations, and the Fidelity of his Accounts, we may allow a much greater Deduction than would be juſtifiable without leſſening the Difficulty. But this Account I have taken Notice of purely for the Sake of the Calculation, which may be of Uſe in the Sequel, the Account it ſelf being in other Reſpects more defective than Dr. *Lower*'s, to which we will return. The Doctor, notwithſtanding his great Sagacity, appears to have overlook'

ſo

ſomething of great Moment and Importance in the Explication of the Action of the Heart: For though it ſhould be granted, that the *Muſcular Fibres* of the Heart, acted by the Nerves, are the immediate Inſtruments of its Conſtriction or *Syſtole*; yet it muſt not be denied that the *Intercoſtal Muſcles* and *Diaphragm* are of great Service to, and facilitate, this Contraction, by opening a Paſſage for the Blood through the Lungs, which denied, would be an invincible Obſtacle. Neither do they promote it that Way only. The Manner how they farther aſſiſt the Heart in its Contraction, will appear manifeſtly, if we conſider the different Poſture, Situation and Capacity, of the Blood-Veſſels of the Lungs, in the ſeveral Times of *Elevation* and *Depreſſion* of the *Coſtæ* or Ribs.

The *Pulmonary Artery* ariſes from the Right *Ventricle* of the Heart, and runs in one Trunk till it comes to the *Aſpera Arteria*, where it is divided, and ſends a Branch along with each Diviſion of the *Aſpera Arteria* according to all the minuteſt Subdiviſions, of which it is likewiſe ſubdivided, accompanying all the *Bronchi* in their whole Progreſs through the Lungs. The *Pulmonary Vein*, which empties it ſelf into the Left Ventricle of the Heart, ſpreads it ſelf on the *Aſpera Arteria* and *Bronchi* in the ſame Manner that the Artery does. The neceſſary Conſequence of this Diſpoſition is, that this Artery and Vein being coextended with, and faſten'd to, the *Bronchi*, muſt needs ſuffer ſuch Alteration of ſuperficial Dimenſions, as the *Bronchi* do in the *Elevation* and *Depreſſion* of the *Coſtæ*.

While the Ribs are in a State of Depreſſion, whether before Commerce with the external Air, or after, the annular Cartilages of the *Bronchi* ſhrink one into another, and by that Means their Dimenſions are exceedingly contracted. In Conformity to this Condition of the *Bronchi*, the *Pulmonary Artery* and *Vein* muſt likewiſe, either by Means of their *Muſcular Coats*, contract themſelves to the ſame Dimenſions, or lie in Folds or Corrugations, which is leſs probable. On the other Hand, when the Ribs are elevated, and the *Diaphragm* bears downward, the Air ruſhing into the Lungs, ſhoots out the Cartilaginous Rings, and divaricates the Branches of the *Trachea*, and by them extends and divaricates the ſeveral Diviſions of the Pulmonary Artery and Vein, and thereby lengthens and enlarges their Cavities.

This Enlargement of their Cavities is very conſiderable, not only upon the Score of the Addition which they receive in Length thereby, but alſo upon the Account of their *Divarication*: For whereas when the Ribs are depreſs'd, and the Lungs ſubſide, the Blood-Veſſels are not only contracted, but their Branches, which are exceeding numerous, approach one another, and lie in *juxta* Poſition, by which their Cavities are very much compreſs'd and ſtreighten'd; when the Ribs are elevated, and the Lungs turgid with Air, not only the Fibres, by which their Coats in the oppoſite State were contracted, are extended by thoſe innumerable Veſſels, which lying before in Lines almoſt parallel one upon another, compreſs'd one another, making an acute Angle at their Junctures, are divaricated and ſeparated from each other, and make an *obtuſe*, whereby their Channels are widen'd. Thus a Paſſage is open'd to the Blood from the Right Ventricle of the Heart to the Left through the Lungs, to which it could not otherwiſe paſs; and the Oppoſition, which the Blood contain'd in that Ventricle muſt otherwiſe neceſſarily have made to its *Conſtriction*, is taken off, and the *Syſtole* thereby facilitated.

Nor is that all; for the *Diaſtole* being caus'd, as ſhall be ſhown, by the Force of the Blood ruſhing into the Ventricles, this Ampliation and Extenſion of the Pulmonary Artery is a Sort of Check or Counterpoiſe to it, and prevents an Endeavour towards two contrary Actions at once, which muſt neceſſarily fruſtrate both; for the Heart being a ſpongy compreſſible Body, whoſe proper Action, which is Contraction, depends on the Influx of certain Fluids in its Fibres or Subſtance, and containing, beſides a Fluid in its Ventricles or great Cavities, in one of which is the Mouth of this Artery, the Action of this Veſſel, muſt in great Meaſure reſemble that of a *Syringe* whoſe Extremity is immers'd in Water, the Enlargement or Expanſion of the Channels of the Artery anſwering the Drawing of the *Embolum*, as the conſtrictive Motion of the Muſcle of the Heart does the Preſſure of the

Atmoſphere upon the Surface of the Water, the one making Way for the Fluid, and the other forcing it to follow where the Reſiſtance is leaſt. In this Senſe we may allow a Sort of Contraction to the *Pulmonary* Artery, depending wholly upon the Action of the *Intercoſtal* Muſcles and *Diaphragm*, which we muſt therefore confeſs to be very ſerviceable and inſtrumental in promoting the *Syſtole* of the Heart.

But if this learned Author be deficient in his Account of the *Syſtole*; that is, if he has not obſerv'd all the Mechaniſm and Contrivance of Nature for the Contraction of the Heart; he has much leſs accounted for the *Diaſtole* or Dilatation of it, which he aſcribes to a Motion of Reſtitution of the overſtrain'd Fibres, which yet he confeſſes are made for Reſtriction only. 'Tis true, he immediately after joins the Influx of the Blood as a concurrent Cauſe; but from the ſlight Notice he takes of it, 'tis plain that he did not ſo much as dream of any great Share it had in that Action. But if Contraction be the ſole Action of theſe Fibres, as this great Man confeſſes it to be, and as indeed it is of all muſcular Fibres; 'tis a Wonder how ſo judicious a Writer came to ſlip into ſuch an Abſurdity as to call their Diſtention, vulgarly, but improperly, term'd Relaxation, a Motion of Reſtitution: For from the Nature of thoſe Fibres, and their Diſpoſition, the Structure of the Heart appears manifeſtly to be *Tonical*, and its Dilatation a State of Violence; and conſequently the *Conſtriction* is the true Motion of *Reſtitution*, and the State to which it will ſpontaneouſly return when the Force is taken off, which is the Work of the *Intercoſtal Muſcles* and the *Diaphragm*.

Thus we are left ſtill to ſeek for the true Cauſe of the *Diaſtole*, which ſeems to be the main and moſt difficult *Phænomenon* relating to the Heart and the Circulation of the Blood. But in Mr. *Cowper*'s Introduction to his Anatomy of Humane Bodies, you will find the Share which Dr. *Lower* aſſigns the Blood to have in that Action further proſecuted, and improved into the main Inſtrument of the Dilatation of the Heart. *The Heart of an Animal* (ſays he) *bears a great Analogy to the* Pendulums *of thoſe artificial* Automata *Clocks and Watches, whilſt its Motion is perform'd like that of other Muſcles, the Blood doing the Office of a* Pondus. By the Blood doing the Office of a *Pondus*, we may ſuppoſe he means, that the Blood contributes in the ſame Manner to the Motion of the Heart, as the Weights do to that of the *Pendulum* of a Clock. If ſo, the Blood, according to him, muſt be the Inſtrument of Conſtriction; and *Dilatation* muſt be the natural State, or ſpontaneous Motion, to which it would, when under no Violence, return: The contrary of which the Judicious Obſerver will find. But if he means, that the Blood in its Reflux, by gravitating on the Auricles and Ventricles, dilates and expands them, acting therein as a Counterpoiſe to its Contraction as a Muſcle, it could have been wiſh'd his Deſign had not bound him up to ſo narrow a Compaſs, and that he had given the World an Explication at large of ſo abſtruſe and important a *Phænomenon*; becauſe the ſpecifick Gravity of the Blood ſeems a Cauſe by no Means alone adequate to the Effect which it is here ſuppoſed to produce: For if the Blood acts only as a *Weight* by meer Gravitation, then that Part of it only which deſcends from the Part above the Heart can be employ'd in that Action. This, at the largeſt Computation, can't amount to five Pound Weight, and muſt, according to the Computation of *Borellus*, force a Machine that is able to overcome a Reſiſtance of 135000 lb. We leave any Body to deduct what he thinks reaſonable, and yet reſt ſecure that it is not to be done, at leaſt with ſo ſmall a Weight.

But neither does the refluent Blood gravitate in any ſuch Proportion as is here aſſign'd. For to make a true Eſtimate of its *Gravitation*, we muſt conſider the Circumſtances of the Liquor ſuppoſed to gravitate, in which it very much reſembles Water incloſed in a Recurve Tube; of which, if the Length of the two Legs be equal, it may be ſuſpended in the Air full of Water, with the Extremities downwards, without loſing a Drop, although the Diameter of thoſe Legs ſhould be very unequal. The Caſe of the Arteries and Veins is pretty near a parallel to a Tube ſo fill'd and inverted; for if the Arteries and Veins be continued Tubes, as by the Microſcope they ſeem to appear, then ſuppoſing their Contents to have no other Determination of Motion than their Weight could give them, the contained Fluids muſt be Counterpoizes to eath other.

For the Veins and Arteries being joined at the ſmaller Extremities, and the larger of both terminating in the ſame parallel Line, it is impoſſible, according to the Laws of *Hydroſtaticks*, that the Contents of either ſhould over-ballance t'other. How far then muſt it fall ſhort of forcing the natural Power and Reſiſtance of ſo ſtrong a Muſcle as the Heart by meer Gravitation.

The Blood indeed has a progreſſive Motion through its Veſſels, wherein it differs from Water in a recurve Tube in the Experiment before ſtated. But if the natural Gravitation of the Blood contributes nothing to the Dilatation of the Heart, this progreſſive Motion will not be found much more ſufficient: For as this Motion is deriv'd entirely from the Heart's Conſtriction, could the Blood be ſuppoſed to react upon the Heart, with all the Force firſt impreſs'd upon it by the Heart, it would be inſufficient; unleſs we will ſuppoſe the Force communicated to be ſuperior to the Force or Power *Communicant*, which is abſurd. But when the juſt and neceſſary Deductions for the Impediments, which the Blood meets with in its Progreſs through the Veſſels, ſhall be made, the remaining Force will be found ſo very weak, that to propel the Blood thro' the Veins may be a Task alone too great for ſo ſmall a Power, without charging it with the additional Difficulty of forcing the Muſcle of the Heart.

We find it ſo far from equal to ſuch a Task, that were it not for the *Valves* which are plac'd in the Trunks of the Veins, the Weight alone would probably be too great for the Impulſe, and the Blood never arrive at the Heart. *Alphonſus Borellus*, after a great deal of ſolemn Pains taken to ſhew his Care and Exactneſs, and to poſſeſs his Reader of the Truth of his Calculations, caſts up the Force of the Heart and the muſcular Coat of the Arteries to be together equal to a Weight of 3750 lb. and allows 'em a Reſiſtance equal to 180000 lb. to overcome which is 45 to 1. To make up for a Diſproportion by his own Confeſſion, incredible to thoſe who have not conſider'd the Matter as he had done, he flings into the Scale the additional Force of *Percuſſion*, which he leaves *indefinite*, and thinks ſufficient to force any quieſcent finite Reſiſtance whatſoever.

But as this Account and *Hypotheſis* are Part of a *Poſthumous* Work, if a Liberty of Conjecture may be allow'd, we have Room to ſuſpect that theſe Papers were left unfiniſh'd by *Borellus*; or at leaſt in many Places the laſt Hand was never put to 'em. For, neither in this Place, nor any other of this Work, does he account for any more than the *Syſtole* of the Heart, and the Reſiſtance which is made to the progreſſive Motion of the Blood in the Arteries only. This alone he found to exceed the Power of the Heart ſo prodigiouſly, that he ſeems to ſhuffle it off his Hands with a general and precarious Solution, as a Difficulty that he was glad to be rid of. For having aſcrib'd this ſtupendous (as he himſelf calls it) Effect to the Energy of *Percuſſion*, he takes no Care to ſatisfy his Reader any further about it, or to refer him, or give him the Expectation of Satisfaction any where elſe; although he has an expreſs Treatiſe on the Force of *Percuſſion*, which was written preparatory to this, and to which he frequently refers in other Places of this Work. But what confirms the Suſpicion that this Part was intended for a farther Reviſe by the Author, is, that he has left the Progreſs of the Blood through the Veins, and the *Diaſtole* of the Heart, abſolutely untouch'd, though they are Difficulties of a much greater Magnitude than this which he has attempted to account ſo ſlightly for. For in theſe he is excluded the Benefit of *Percuſſion*, and has yet a greater Reſiſtance to overcome without it. Omiſſions of this Kind are ſo unuſual with this Author, where ever he knows himſelf to go upon ſure Grounds, that it is an Argument he doubted the Sufficience of his Percuſſion, and reſerv'd theſe important *Phænomena* for farther Conſideration, without plunging himſelf into ſuch an Abſurdity as to aſcribe to *Percuſſion* any ſuch Energy as to be able, by its Re-action, to force that Power from whence only it was at firſt deriv'd.

Dr. *Lower* and Mr. *Comper* deliver their Opinions of the Cauſe of the Dilatation of the Heart ſo very ſhort, and without any Arguments to ſupport 'em, that by expoſing them naked, they ſeem rather to diſcourſe of it

it tranſiently, as Men oblig'd by the Nature of their Subject to ſay ſomething of it, than ſolicitous to give any full or ſatisfactory Account, and therefore we ſhall leave them here. But though the *Hypotheſis* of *Borellus* may in this Caſe be found precarious or inſufficient, his *Theory* holds good ſtill: At leaſt it ought to be allow'd in Juſtice to his great Abilities and Exactneſs, till ſome Body convicts him of an Error, which has not yet been done by any Body that we know of. Suppoſing then the Force of the Heart, and of the muſcular Coat of the Arteries, as likewiſe of the Reſiſtance which they muſt overcome, to be computed with any Degree of Accuracy, there remains yet ſuch a prodigious Diſproportion to be accounted for, as requires ſome more powerful Agent than any yet aſſign'd, to make up the Deficiency.

What Aſſiſtance the Heart receives from the Action of the *Thorax* towards the facilitating its Contraction, without which Aſſiſtance there could have been no *Syſtole*; but neither the *Intercoſtal* Muſcles, or *Diaphragm*, which are ſo inſtrumental in that Part of its Action, can contribute any Thing to the *Diaſtole*; becauſe they ſerve only to enlarge the Cavity of the *Thorax*, and thereby to open a Paſſage to the Blood from the Heart, and promote its Conſtriction. Whatever therefore the Force is that dilates the Heart, and is the Cauſe of the *Diaſtole*, it muſt be equal to that of the Heart, the *Intercoſtal Muſcles*, and *Diaphragm*; to all which it acts as an Antagoniſt, without taking Notice of the *Serratus major Anticus*, and other Muſcles, which have an obſcure Share in the Elevation of the *Coſtæ*, becauſe as much may reaſonably be deducted upon the Account of the *Obliquus externus Abdominis*, and other Muſcles, which having their Inſertions on ſome of the lower Ribs, are as inſtrumental towards the *Depreſſion* of 'em, and ſo ballance the Account. But the chief Uſe of theſe is in violent Reſpiration; in ordinary Reſpiration their Share is ſmall.

Such a real Power is hard, nay perhaps impoſſible, to be found in the Machine of an animal Body; and yet without ſome ſuch Antagoniſt, it is impoſſible the Circulation of the Blood ſhould be maintain'd. All the Engines yet diſcovered within the Body conſpire towards the Conſtriction of the Heart, which is the State of Quieſcence to which it naturally tends; yet we find it alternately in a State of Violence, that is, of *Dilatation*, and that upon Neceſſity, becauſe upon this *Alternation* depends all Animal Life. Some ſufficient external Cauſe muſt therefore be found, to produce this great *Phænomenon*, which Cauſe muſt be either in the *Air* or *Atmoſphere*, becauſe we have no conſtant and immediate Commerce with any other *Media*.

Some great Phyſicians obſerving this, and that depriv'd of whatſoever Means of Communication with external Air we became inſtantly extinct, have imagined, that in the Act of Inſpiration, certain purer Parts of the Air mix'd with the Blood in the Lungs, and were convey'd with it to the Heart, where they nouriſh'd a Sort of *Vital Flame*, which was the Cauſe of this reciprocal *Æſtus* of the Heart. Others not quite ſo groſs, rejecting an *Actual Flame*, have fancied that theſe fine Parts of Air mixing with the Blood in the Ventricles of the Heart, produc'd an Effervеſcence which dilated it. But theſe Fancies have been long ſince exploded and condemned upon ample Conviction, and 'tis a Point yet undetermined, whether any Air mixes with the Blood at all in the Lungs, or not. But ſuppoſing that ſome Air may inſinuate it ſelf into the *Pulmonary Vein*, it can no other Way dilate the Heart than by an Effervеſcence in the Left Ventricle, which would not dilate the Right: But this Opinion is contradicted by *Autopſie*, and too laboriouſly confuted by others, to be brought upon the Stage again here.

There remains therefore only the groſs Body of the *Atmoſphere* to be conſidered, which is undoubtedly the true Antagoniſt to all thoſe Muſcles which ſerve for ordinary Inſpiration, and the Conſtriction of the Heart. This will appear the more evident, if we conſider not only the Power, but the Neceſſity of its Action upon Animal Bodies, as well as the Want of other ſufficient Agents. The Heart is a ſolitary Muſcle, of very great Strength; and the *Intercoſtal Muſcles* and *Diaphragm*, which likewiſe have no *Antagoniſts*, are a vaſt additional Force, which muſt be ballanc'd by the contrary Action of ſome equivalent Power

or other. For tho' the Action of the Intercoſtal Muſcles be voluntary, that does not exempt 'em from the Condition of all other Muſcles ſerving for voluntary Motion; which would be in a State of perpetual Contraction, notwithſtanding any Influence of the Will, were it not for the Libration of Antagoniſt Muſcles. This Libration between other Muſcles is anſwer'd by the Weight of the incumbent *Atmoſphere*, which preſſes upon the *Thorax* and other Parts of the Body. And as in all other voluntary Motions, the Influence of the Will only gives a Prevalence to one of the two Powers before *equilibrated*, ſo here it ſerves to enable thoſe Muſcles to lift up a Weight too ponderous for their Strength not ſo aſſiſted; and therefore as ſoon as that Aſſiſtance is withdrawn, the *Coſtæ* are again depreſs'd by the meer Gravitation of the *Atmoſphere*, which would otherwiſe remain elevated, through the natural Tendency of thoſe Muſcles to Contraction.

This is evidently prov'd from the *Torricellian* Experiments, and thoſe made upon Animals in Mr. *Boyle*'s Engine, where as ſoon as the Air is withdrawn, and the Preſſure thereby taken off, the *Intercoſtal* Muſcles and *Diaphragm* are contracted, and the Ribs elevated in an Inſtant, which can't by any Power of the Will be made to ſubſide, till the Air is again let in, to bear 'em forcibly down. It were ſcarce worth while to take Notice here of a Miſtake of the learned *Willis*, were it not for the Authority of that great Man, which is ſufficient to keep that Error in Countenance even to this very Day. The Doctor having obſerv'd that the Fibres of the external and internal Intercoſtal Muſcles ran in a contrary Order, as it were decuſſating each other, takes Occaſion from thence to fancy, that there was an Oppoſition in their Office, and that as the *external* ſerv'd to raiſe up the Ribs, the *internal* drew them down again, forgetting at that Time, that when a contractile Body is faſtened at the ſeveral Ends to Points unequally moveable, let the Contraction happen in what Part or Manner ſoever, the more moveable Point muſt be drawn towards the leſs moveable; by which Rule, whether *external* or *internal Intercoſtals* be contracted, the lower Ribs will be forced to approach the upper, that is, be raiſed up.

As in the Elevation of the *Coſtæ*, the Blood, by the Paſſage that is open'd for it, is in a Manner ſollicited into the Lungs; ſo in the Depreſſion of 'em, by the Subſidence of the Lungs, and the Contraction of the Blood-Veſſels, both which are ſubſequent thereof, the Blood is forcibly driven as it were with an *Embolum* through the Pulmonary Vein into the Left Ventricle of the Heart. And this, together with the *general Compreſſion* of the Body, by the Weight of the Atmoſphere which ſurrounds and preſſes upon the whole Surface of it, is that Power which cauſes the Blood to mount in the Veins after the Force impreſs'd upon it by the Heart is broken and ſpent, and which is ſufficient to force the Heart from its natural State to Dilatation.

He that is able to compute the Weight of a Column of Air equal to the Surface of the whole Body, will readily grant it a Power ſufficient for the Effects which are here aſcrib'd to it. And when he conſiders that the Bodies of Animals are compreſſible Machines, he will find that it muſt of Neceſſity affect them in the Manner here laid down. But tho' our Bodies of *Tubuli* or Veſſels fill'd with Fluids, yet this Preſſure, how great ſoever, being equal, could have no Effect upon 'em, if the ſuperficial Dimenſions were not eaſily variable; becauſe being compreſs'd on all Parts with the ſame Degree of Force, the contain'd Fluids could not any where begin to recede, and make Way for the reſt to follow, but would remain as fix'd and immoveable as if they were actually ſolid. But by the Dilatation of the *Thorax*, Room is made for their Fluids to move, and by the Coarctation of it, freſh Motion is impreſs'd, which is the main Spring whereby the Circulation is ſet and kept going. This reciprocal Dilatation and Contraction of the ſuperficial Dimenſions of the Body, ſeems ſo neceſſary to animal Life, that there is not any Animal ſo imperfect as to want it, at leaſt none to the inward Structure of which our Anatomical Diſcoveries have yet reach'd: For tho' moſt Kinds of Fiſh and Inſects want both moveable Ribs and Lungs, and conſequently have no dilatable *Thorax*, yet that

Want

Want is made up to them by an analogous Mechaniſm, anſwering ſufficiently the Neceſſities of their Life.

Thoſe Fiſhes which have no Lungs have *Gills*, which do the Office of Lungs receiving and expelling alternately the Water, whereby the Blood-Veſſels ſuffer the ſame Alteration of Dimenſions that they do in the Lungs of more perfect Animals. The Lungs or *Air-Veſſels* of *Inſects* are yet exceedingly more different in Structure, Diſtribution, and Situation, from thoſe of perfect Animals, than thoſe of Fiſhes are, and yet in their Uſe and Action agree perfectly with both, that is, removing and expelling the Air, and varying the Dimenſions and Capacities of the Blood-Veſſels. Theſe having no *Thorax* or ſeparate Cavity for the Heart and Air-Veſſels, have the latter diſtributed through the whole Trunk of their Bodies, by which they communicate with the external Air through ſeveral Spiracles or Vent-holes, to which are faſtened ſo many little *Trachea*, or Windpipes, which thence ſend their Branches to all the Muſcles and *Viſcera*, and ſeem to accompany the Blood-Veſſels all over the Body, as they do in the Lungs only of perfect Animals. By this Diſpoſition, in every *Inſpiration*, the whole Body of theſe little Animals are inflated, and in every Expiration compreſs'd, and conſequently the Blood-Veſſels muſt ſuffer a *Viciſſitude* of Extenſion and Contraction, and a greater Motion muſt thereby be impreſs'd upon the Fluids contain'd in them, than the Heart, which does not in theſe Creatures appear to be muſcular, ſeems capable of giving.

The only Animal that is exempted from this neceſſary Condition of Breathing, or receiving and expelling alternately ſome Fluid into and out of the Body, is a *Fœtus*: But this, while included in the Womb, has little more than a Vegetative Life, and ought ſcarce to be reckoned among the Number of Animals. For were it not for that ſmall Share of *Muſcular* Motion which it exerciſes in the Womb, it might without Abſurdity be accounted for as a Graft upon, or Branch of the Mother. It muſt be confeſs'd that *Oviparous* Animals are denied the Benefit of this Communication; but that Want is ſufficiently compenſated by a peculiar Mechaniſm, which directly anſwers the Ends of Reſpiration, and the Preſſure of the *Atmoſphere* upon the *Fœtus*. There is at the obtuſe End of an Egg a ſmall Cavity fill'd with Air, which is the ſuccedaneous Inſtrument to the reſpiratory Organ. For as ſoon as the Contents begin to be warm'd by the Incubation of the Hen, or any *Analogous* Heat of the Furnace or Dunghil, the ſeveral Humours of the Egg acquire a *Fermentative Motion*, and the Air contained in the *Cavity* or *Veſicle* at the obtuſe End of the Egg is rarified, and the *Veſicle* extended and enlarged, and conſequently the other Contents are compreſs'd, which the Fermentative Motion naturally reſiſts. But both Bodies being as well compreſſible as dilatable, and both having an expanſive Motion impreſs'd upon 'em by *Incubation*, the Compreſſion and Reſitency will be mutual; but varied in Degree, according as either through the Variation of Circumſtances ſhall prevail. By this Means an Alternation of Compreſſion and Dilatation will be produc'd, in both anſwering the Reſpiratory Motion, which, as ſoon as the Organs by which it ſhould be regulated are compleated, will, in the Body of the *Pullus*, be Regular and Circulatory.

Fabritius ab Aquapendente, and after him our great *Harvey*, have aſſign'd divers Uſes to this Cavity or *Air-Veſicle*, the Extravagance of which have perhaps deter'd others from enquiring ſo much into the Uſe, as the Importance of it required. But though I cannot agree, ſays our Author, to that *Perſpiration*, *Refrigeration*, and *Reſpiration*, which they make it the Inſtrument of; yet perhaps the Air that was incloſed in that Cavity may, through the Augmentation of the Body of the *Pullus*, and its own Rarefaction, which is at laſt ſo great as to occupy half the Shell, break the Membrane which ſeparated it from the *Chick*, and thereby give ſo much Reſpiration as to form the *Chirping Voice* which is often heard before the Breaking of the Shell: But how it ſhould reſpire ſooner, ſeems inconceivable.

That incomparable Philoſopher *Harvey* enquires, Why a *Fœtus*, taken out of the *Uterus* with the Membranes entire, ſhall live in Water ſome Hours without Communication with the external Air? Whereas if it be taken out and ſuffer'd once to breath, it

can't

can't afterwards ſurvive a Moment without the Benefit of Reſpiration. Granting the Fact to be as he has delivered it, which yet is not ſo in all Caſes, the main Difficulty is grounded on a Miſtake, which from the ſtating of the Queſtion this great Man has fallen into: For he thinks that a *Fœtus* is ſooner ſuffocated, after having once breathed, than if it had not breathed at all, and that by Breathing it had contracted ſomething which render'd it more periſhable. *Idem* (ſays he) *tamen exatus, ſi ſemel Aerem intra Pulmones attraxerit, poſtea ne Momentum quidem Temporis abſque eo durare poſſit, ſed confeſtim moriatur.* And preſently after, *Siquidem conſtat Fœtum, poſtquam eum ſemel hauſerit, citius ſuffocari; quam cum ab illo prorſus arcebatur.* The Doctor obſerving a *Fœtus* to live longer without Reſpiration, and to diſpence better with the Want of Air while included in the Membranes entire than it could afterwards; infers thence, that the Air does in the firſt Act of Inſpiration impreſs upon the Lungs ſome Quality, which renders it ever after more indiſpenſably neceſſary. But allowing his Obſervation, we may deny his Inference to be good; for deprive a *Fœtus* of Means of Reſpiring, and then take it out of the Membranes, and it ſhall be as ſoon ſuffocated, as if it had never reſpired before. This proves that this Neceſſity of Intercourſe with the Air by Way of the Lungs, is not the *Offspring* but the Parent of Reſpiration, and that that learned Man was drawn into a Fallacy of *Non Cauſa pro Cauſa.*

The Reaſon of this Neceſſity is the Preſſure of the external Air upon the Surface of the Body, from which it was defended by the Interpoſition of the Membranes and the Humours contain'd, which are not ſo compreſſible as the Body of the *Fœtus* it ſelf. So ſoon therefore as the *Fœtus* is excluded, and expoſed to the immediate Contact of the ambient Atmoſphere, the Veſſels and all the Cavities of the Body muſt neceſſarily be ſo compreſs'd, that the Fluids can't have Room for Motion, and conſequently the *Fœtus* could have no Life, if Nature had not contriv'd by the Motion of the *Thorax* to remove and admit that Preſſure alternately, and thereby to impreſs a Motion on the Fluids, which is the Spring of Life. But this Motion of the *Thorax* being any Way ſuppreſs'd, the equal Preſſure of the *Atmoſphere* on all Parts occaſions a total Ceſſation of Motion, which is Death.

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Verheyen's *Examination of the Two oppoſite Opinions of thoſe two eminent Anatomiſts,* Lower *and* Vieuſſens, *concerning the Ferment of the Heart, and the Texture of its internal Membrane: Wherein Truth is detected, and the many Originals of the Veſſels extended through the Auricles of the Heart, and opening into the Cavity thereof, as well as into thoſe of the Ventricles, are demonſtrated.* By Phil. Verheyen, M. D.

I Thought I had done my Duty in the Deſcription of the Heart, but here is a new Difficulty ſtarted, which I met with in a little Tract written in *French*, Intituled, *New Diſcoveries of the Heart; by* Raymond Vieuſſens, *Dr. of Phyſick of the Faculty of* Montpellier, *and Fellow of the Royal Society*, London. The Deſign of the Author is to eſtabliſh a peculiar Kind of Ferment in the Ventricles of the Heart, by whoſe Aſſiſtance the Blood is not only exalted in them, and rendered finer and more ſubtil; but alſo ruſhes more ſuddenly into the Arteries with a greater Swell. This directly thwarts the Opinion of the famous *Lower*, who abſolutely denies any ſuch Ferment as quoted from him by *Vieuſſens*, in theſe Words: *In Corde autem ejuſmodi Fermentum dari qui contendunt oſtendere debuiſſent. Si enim Arterias Coronarias ubique in Cor diſtributas, in Ventriculos ejus Succum quendam effeudire dicant, advertere oportet Membranam Ventriculorum interiorem adeo imperviam eſſe, ut nihil in Cavitatem ejus penetrare patiatur; prout a Tinctura quavis Arteriis iſtis Vi injectu manifeſte apparet.* See *Lower*'s Treatiſe *de Motu Cordis*, where he aſſerts the internal Membranes of the Ventricles are impervious, while *Vieuſſens* pretends to ſhow they are entirely pervious, and have plain Paſſages by which that Ferment may be convey'd to the Heart; and indeed there are ſuch Paſſages that are manifeſt enough, but this does not prove any peculiar Ferment carried thoſe Ways.

Vieuſſens propoſes ſeveral curious Experiments worthy Obſervation, but charges them with Conſequences that are too extenſive, as will clearly appear from what follows, with conſulting the four Figures in the fourth Table, where are ſhown ſeveral Ducts opening into the Ventricles and Auricles of the Heart, diſcover'd by *Vieuſſens*. Firſt of all, tying the Trunk of the *Vena Cava* as well above as below the Right Auricle of the Heart, and having likewiſe bound the Pulmonary Vein and Artery, he injected a Tincture of Saffron into the Left Coronary Artery; but without the Violence of the injected Tincture, the Part paſſes immediately by the Branches of the ſaid Artery into the whole Texture of the Left Auricle, as appears by its Inflation ſtrutting out, and yellow Colour; and from the inward Contexture of that Auricle it will fall into its Cavity, and from thence into the Pulmonary Vein and Left Ventricle of the Heart.

This firſt Experiment, ſays *Vieuſſens*, clearly proves, that there are no Veins in the Left

Left Auricle; for had there been any, the Tincture of Saffron would have insinuated it self into their Cavities, and from thence been carried into the Right Auricle and Right Ventricle of the Heart by the *Vena Cava*, where all the Veins of the Body proximately or remotely unite. From hence he made other Experiments by Injections of the same Tincture, sometimes into the Right, sometimes the Left Coronary Artery, and saw them respectively pass into the Right or Left Ventricle of the Heart. He found from hence a great Number of *Meatus's* or Openings in the Cavities of the Heart, particularly ending in the internal Superficies of the Cavities which he call'd the Carnous Ducts, and said they are continued to the Arteries. At length he concludes, First of all, That the *Coronary Veins*, with their Branches, are superficial to the Heart, which he further proves, because the Tincture of Saffron injected into them did not dye the internal Texture of the Heart: Secondly, That those Veins have no immediate Communication with the superficial Arteries of the Heart, as the Veins of the Liver, Spleen, and other Parts, have; since the Communication in the Heart is from the Intervention of the Carnous Passages, which proceed from the Sides and extreme Ends of the superficial Arteries of the Heart, and join the Sides of the Veins of the same. Thus far *Vieussens*.

As soon as I had read this Book, says *Verheyen*, I silently approv'd what was said relating to the Passages to the Cavity of the Auricles and Ventricles of the Heart, because I had not only discover'd and shewn that there were several Trenches in the internal Substance of the Heart, but also *Foramina* or Holes like the Orifices of certain Ducts; as likewise, because it is agreeable to Reason that the Blood should rather pass from the internal Substance of the Heart into Cavities by short Passages, than by a long Tract of the Coronary Vein and Artery, and chiefly to the Right Ventricle, for Reasons hereafter. Besides, I cannot but be of Opinion that those short Passages are any Thing else but Veins. I cannot by any Means agree with *Vieussens*, in his Assertion that there are no Veins in the Auricles of the Heart, since it does not appear consonant to Reason, and what may appear clear to him, may seem otherwise to me; for it is often seen, that a Liquor injected into the Arteries, has not been convey'd into the Vein that answers to them in other Parts of the Body: Neither need it look strange, since the Passages in the Body are easily obstructed by a grumous Viscid or thick Blood, or that is congeal'd or coagulated by Cold. But it agrees with *Vieussens*'s own Experiments, that a Liquor injected finds the Passages opener towards the Cavity of the *Auricle*.

And because that Author had made his Trials rather upon the Hearts of Oxen and Sheep, than Humane, I presently took an Ox's Heart, and in that cut open the Pulmonary Vein from its Orifice towards the Left Auricle, separating the Fat: There I found a Branch, that immediately departing from the Coronary Vein, is extended by the said Substance of the Auricle, and passing on further, takes in Branches to the Number of Five, and sometimes in another Subject to that of Eight, as *Fig. I. Tab. IV.* shows at the Letters *c*, *c*. Eight correspond to those Venous Branches, where there are as many Arterious Trunks cut off from the Left Coronary Artery *E*. and under the Fat *C*. inclining to the Veins: But these must be cut off, lest they hide the Ramifications of the Vein.

Having seen and examin'd these, I went forward and pursu'd the Coronary Vein, where I saw it at last, with a larger Branch or Trunk, enter the Substance of the Right Auricle, and there presently divide it self into two Branches of almost an equal Thickness, to wit, into the Right at *c*. and Left at *e*. About the Division, but more from the Right Branch, appear two small Shoots, which run through the Substance of the Auricle; but the larger Branch *c*. presently sinks into the Substance of the Auricle, and sending forth some Twigs, opens into the Cavity of the Auricle with a large Mouth, by which not only Liquor appears, but the Probe thrust into the Vein, by which Mouth afterward I blew up the Vein, and thereby discover'd many of its Branches dispers'd throughout the Substance of the Heart. I found besides two other Mouths of the Veins opening into the same Cavity of the *Auricle*, to wit, the Tracings of the same Vein, which, by reason of the uneven or furrow'd Sub-

stance

ſtance of the Auricle, I could not well obſerve; but I put a pretty thick Probe into the Mouth of the Vein I ſpoke of before.

The Left Trunk ſpreads its Branches every where through the Subſtance of the Auricle, ſome of its Shoots ending in the Cavity of the Auricle, and ſome in the *Vena Cava*. The Arteries from the Right Coronary correſpond or anſwer to the ſaid Veins, but not ſo exactly in Number and Size as in the Left Auricle. I demonſtrated all theſe Things clearly to that Skilful and Accurate Anatomiſt *D. M. Palfyn*, who brought me that little Tract of *Vieuſſens*, to deſire my Opinion upon it: And hereby I ſhew'd, that *Vieuſſens* was wrong in his Aſſertion that the Auricles of the Heart were plainly deſtitute of *Veins*: For directly oppoſite to his Opinion, I will ſhow, that the Auricles of the Heart abound with *Veins*, and give a more convincing Reaſon according to the beſt of my Underſtanding. I have laid down this from what has been ſaid by *Vieuſſens* in his new Diſcoveries, that there are ſcarce any or no Veſſels at all in the *Auricles*. And firſt of all in an Ox's Heart, as I have ſaid, I have found Veſſels which brought Blood immediately from the Subſtance of the Right Auricle into its Cavity, without which it was formerly thought to return by the great Trunk of the Coronary Artery, though I have ſhown that thoſe Veſſels were the Coronary Veins, and not peculiar Ducts, as *Vieuſſens* would have them to be. But that we may proſecute the remaining Obſervations, I took the great Branch of the Coronary Vein, which lay almoſt exactly to that Place where the external Side of the Right Ventricle was join'd internally to the *Septum*, and tying the other large Branches, leſt the injected Liquor ſhould paſs readily to the Coronary, I ſyring'd common Water into the ſame Branch, which went directly to the Cavity of the Right Ventricle, and iſſued out at the Orifice of the *Vena Cava*, that was cut off.

And that we might ſee the Water ruſhing out, and obſerve the very Places whence it broke forth, I open'd the ſaid Ventricle in the oppoſite Part to the Tract of the ſaid Vein, leſt cutting the more remarkable Branch, the Liquor finding a readier Paſſage, might not go to the Ventricle, but flow out ſo plentifully from the internal Mouths of the Ventricle, that the Places would be hid whence they came forth; but putting in a Pipe, I blew into the Veſſel, which mixing with the Water, ſprung out in Bubbles, by which Means the Apertures were apparent. The Mouths of the Veins from whence the Wind iſſued appear'd to be very numerous, and ſome of them were cover'd by the internal Membrane of the Heart like a Valve, inſtead of which there is an oblique Inſertion to others. Cutting open the Mouths of ſeveral Veſſels, from which the Water flows plentifully, I ſaw in their Sides ſome leſſer *Foramina*, ſuch as the Accurate *Vieuſſens* has deſcrib'd; but there are in ſome four or five, in others fewer, and undoubtedly as many Mouths of the Trunks throwing in Blood into the *Ventricle*. Then binding the greater Vein which I had blown up, I choſe another that had more Relation to the Left Ventricle, which was likewiſe fill'd with the injected Water; but whether we look'd upon this or the Water, we could not obſerve there above four whoſe Orifices we could diſcover. I try'd the ſame Experiment with the *Coronary Arteries*, and took Notice, that the Liquor, whether forc'd by the Wind or Water, broke out more eaſily and plentifully into the Cavity of the Ventricle, by the Mouths opening thereunto being thrown into the Veins, than that that was ſent by the Arteries, and a little Time after I publickly demonſtrated the ſame in a Calf's Heart with the like Succeſs.

This was the firſt Time I found that the *Coronary Vein* was as it were double. In like Manner alſo the *Coronary Artery* is form'd from two Arteries, which from their Origine run contrary, but in Courſe performs the Part of an Inoſculation. So likewiſe the *Coronary Vein* has two Trunks, to wit, that which opens into the *Vena Cava* from the oppoſite of the Auricle, and that which terminates in the Cavity of the ſame Auricle, in which the Probe is put at *d. Fig. III. Tab. IV.* in which Cavity alſo other leſſer Branches terminate. All theſe Things ſaid to be obſerv'd by me in an Ox or Sheep's Heart, I afterwards publickly demonſtrated in a Humane One, but not with the ſame Eaſe, which I take to be, becauſe the Humane Body had laid ſeveral Days in the Ana-

tomical Theatre at a cold Time of the Year, and in a cool Place, by which Means the Paſſages are much ſtraiten'd or contracted.

From the Obſervations therefore that have been made, it is evident that moſt of the Mouths of the Veſſels apparently open into the Cavities of the Ventricles and Auricles of the Heart, at leaſt from the Right Auricle, and indeed much more from the Right than the Left. Beſides, it is plain that thoſe Veſſels in the Right Auricles of the Heart are Veins, becauſe, as has been ſaid before, not only the Liquor of the Coronary Vein thrown in by their Mouths, readily breaks out again, but alſo the larger Probe, thruſt into the ſame Vein near the Auricle, is brought to its Cavity without any remarkable Oppoſition. But it is not equally plain concerning thoſe *Ducts*, that they immediately end in the Cavities of the *Ventricles*, which *Vieuſſens* ſays are *Carnous*. It is certain, we may deny that thoſe *Ducts* are any Thing peculiar, as either differing from the common Blood-Veſſels, or by carrying ſome particular or ſpecial Humour in them, who ſeriouſly conſiders there is no Reaſon why ſuch Ducts ſhould have that Connexion with the Veins; I ſay there's no Reaſon, becauſe thoſe Ducts, according to the Laws of Circulation, ſhould receive their Liquor from the Arteries, and carry it immediately into the Hollow of the Ventricle; therefore have no direct Intercourſe with the Veins, juſt as the Urinary Ducts in the Kidneys have none. Beſides, if theſe Ducts convey'd any particular Humour, they ought to have certain Inſtruments, as Glands, and thoſe pretty remarkable, conſonant to the Size of the Ducts, and therefore they would be conſpicuous; but upon Inquiry not finding any ſuch, we may conclude there are none.

Therefore it follows from hence, that thoſe *Ducts* are *Venous*, to wit, either Veins properly ſo call'd, or the Continuation of Veins, though perhaps from the compact Subſtance of the Heart, or ſome other Cauſe unknown to us, their Subſtance is no ways different from the common Veins, which as yet I have not been able to ſatisfy my ſelf in: Neither do the Experiments of *Vieuſſens* convince me, by which he contends that the internal Texture or Compoſition of the Heart has no Veins in it, becauſe not dy'd by the Tincture of Saffron injected into the *Coronary Vein*, ſince common Water emitted into the ſame Vein paſſes plentifully many Ways into the Cavity of the Ventricle, and indeed much eaſier than if thrown into the *Coronary Arteries*. But it is plain there are no Valves in the ſaid Veins, ſince the Liquor injected into a larger Branch, readily paſſes into a ſmaller; whence I judge, the Blood does not always take the ſame Rout in thoſe Veins, but ruſhes into the *Ventricles* when empty, and when full of Blood, diverts its Courſe into the greater Trunks of the Coronary Vein, and from thence is carried further into the Right Vein or *Auricle* of the Heart. The Tract of the ſaid Veins, and their Mouths or Openings into the Cavity, as well of the Ventricle, as Right Auricle of the Heart, and ſome into the *Vena Cava*, are delineated in *Tab. IV. Fig. III.*

The Examination of another Opinion of Vieuſſens, *wherein he denies the Reſtraining or Contracting Fibres to the Heart, Womb, Stomach,* &c. *By* Phil. Verheyen.

WE have already handled the Controverſy betwixt thoſe two Famous Men, *Lower* and *Vieuſſens*, concerning the internal Membrane of the *Ventricles* of the Heart, which the firſt holds to be impervious, but the other to abound with a great many Holes, through which is carried a certain Humour or Blood into the Cavities of the *Ventricles*. We may ſee *Vieuſſens* triumphing, but at the ſame Time ſee his Trophy ſullied by his own Miſtakes, ſince he denies the Veins, that are ſo evident in the *Auricles* of the Heart, that they are obvious at firſt Sight in a Humane Subject. But *Vieuſſens* proceeds, and reproves *Lower* for aſſigning Conſtrictory Fibres to the Heart; becauſe, according to his

Opinion, he could not doubt but that the Subſtance of that *Viſcera* was a true Texture or Compoſition of Veſſels, according to the following Experiments, Reaſons, Deductions, *&c.* But with all his Experiments and Reaſonings, he ſhows nothing, but that the Blood is circulated not only by the Veins and Arteries of the Heart, but likewiſe by thoſe Parts which are wont to be call'd the Carnous Fibres or the *Motrices*, the moving Fibres of the Heart, which certainly at this Day is no new Thing, but every where receiv'd.

The Paſſage of the Blood by the Muſcular Fibres *Blanchard* takes Notice of, and proves in his Obſervations, and *Zypæus* in his Inſtitutions, under the Article of the Circulation of the Blood. I have alſo clearly ſhown the Paſſage of the Blood by Means of ſuch-like Fibres, amongſt which the *Motrices* or Movers of the Heart are reckon'd; and this I took Notice of in the firſt Edition of my Anatomy, publiſh'd ſome Time before theſe Diſcoveries of *Vieuſſens*, in theſe Words: *Sunt autem Fibræ Carnoſæ, quantum per Experientiam colligimus, intus cavæ, multis Inæqualitatibus ſeu Cavernulis donatæ, in quibus Sanguis data Occaſione uberius detinetur.* And ſome Weeks ago I met with another Book, writ in *Latin* by the ſaid Author, Entituled, *Novum Syſtema Vaſorum Sanguiferorum in Corpore Humano*; or, A New Syſtem of the Blood-Veſſels in a Humane Body. Reading this over with great Eagerneſs, I found Mention made of Veſſels that were call'd *Nervous Lymphæducts*, and not doubting but under this Name I ſhould meet with ſomething new and unknown to me, I run thro' the whole Book, but found that I had read before what our Author meant concerning theſe Veſſels.

Herein I ſaw, that the ſame Author denied the Conſtrictory Fibres to the Womb, and if I be not miſtaken, to the Stomach and Inteſtines too; and at laſt I took Notice, that thoſe Nervous Lymphæducts, as he calls them, were the very ſame with the common Contracting or Moving Fibres of the Heart, which he would prove were continued to the ſmall Arteries, and receiv'd from them a certain Fluid like *Lympha*, and for that Reaſon ought not to be call'd Fibres, but *Vaſcula* or Veſſels. I could not, ſays *Verheyen*, quote the Words of the Author, becauſe by ſome Miſchance I have loſt his Book; but, continues he, as I take it, there is nothing new in his Opinion but a new Name; and though *Vieuſſens* arrogates this to himſelf, it was diſcover'd and publiſh'd ſome Time ago by that Incomparable Anatomiſt *Ruyſch.* But yet it remains a Queſtion, whether the firſt ought to be called *Vaſcula Carnoſa*, and the latter the Nervous Lymphæducts, laying aſide the former receiv'd Name of Fibres, as *Vieuſſens* would have it. I am clearly of Opinion, ſays *Verheyen*, it is much better to keep to the former Names of the Conſtrictory or Moving Fibres, they being both more agreeable to Authority, Reaſon, and the Nature of their Office.

Of the Diſeaſes of the Thorax, *and their Cures. From* Michael, Sydenham, Morton, Willis, Baglivy, St. Hilaire, Dion, Michael Torres: *With Mr.* Chaillon's *Obſervations upon the* Heart, *and its Veſſels*, &c. *And firſt of the* Oeſophagus *or* Gullet. *From* St. Hilaire.

THE principal Diſeaſes of the *Gullet*, are Tumours, Contraction, Ulcers and Wounds. The Tumours are occaſion'd like all others, by the Obſtructions of the nutritious Juices that are form'd in the Glands of the *Oeſophagus*. They are diſtinguiſh'd by their Pain and Difficulty of ſwallowing, which yet is not ſo great as in the *Quinſey*, which is larger, and preſſes more forcibly upon the *Trachea* or Windpipe.

The Contraction comes from a *Paralyſis* or *Convulſion* by ſome Tumour of the Part, or thoſe adjacent, or by an Inflammation or Caruncles in the Paſſage; or in ſhort, by a Wound or Ulcer. Sometimes it affects the Circumference of the *Pharinx*, that forms a Cartilaginous Ring, by which Means the Gullet is contracted. The *Paralyſis* happens from an Obſtruction that hinders the Animal Spirits from flowing into the Fibres of the Muſcles of the *Pharinx*, which may be perceiv'd by the Fault of Deglutition, without which there appears no other Sign of Damage. This Diſeaſe is very dangerous, and ſometimes cauſes Death, becauſe that the Patient cannot ſwallow. If it proceeds from the Want of Animal Spirits, and the entire Loſs of Strength, as happens ſometimes in Acute Fevers, it is a very ill Sign; the Drink falls then into the Stomach with ſuch a like Noiſe as Water makes when pour'd into an empty Bottle. In the Convulſion, the Mouth continues always ſhut; they feel great Pain ſhooting into the Breaſts and other Parts. This Indiſpoſition is much more dangerous in Acute than Chronick Diſeaſes.

Such Bodies as ſtop in the Gullet, as Fiſh-Bones, Cherry-Stones, Plum-Stones, *&c.* are known by the Relation of the Patient, or thoſe that ſtand by. It cauſes a Pain ſometimes that is ſucceeded by a Tumour, Inflammation, Abſceſs, and ſometimes Death. The Inflammation is known by the Pain, Pulſation, Fever, and Difficulty of ſwallowing, and ends ſometimes in a very troubleſome Ulcer. The Ulcers of the Gullet are known by the *Pus* that is collected at the Bottom of the Mouth, and the Difficulty of ſwallowing. They are occaſion'd by the Acrimony of the nutritious Juice, that corrodes the Fibres, and are always dangerous, becauſe they hinder Deglutition. Wounds are eaſy to know by the Difficulty of ſwallowing, ſpitting of Blood without coughing, and by the flowing out of the Victuals and Drink.

Of

Of the Diſeaſes of the Trachea *or* Windpipe. *From* St. Hilaire. *With the Operation of cutting the* Windpipe *in the* Quinſey, *call'd* Bronchotomia. *From* Dion.

THE principal Diſeaſes ſubject to the *Trachea*, are Quinſeys, Contractions, Roughneſs, Wounds, Ulcers, the *Aphonia*, Loſs of Voice, or Hoarſeneſs. The *Angina* or *Quinſey* is an Inflammation of the Muſcles of the *Larynx*, and other Parts of the Throat, of which there are two Sorts that Authors have diſtinguiſh'd, the *Baſtard*, and the *Real One*. The Spurious *Quinſey* is a Settlement of Seroſities or Flegm, which ſoaking into the Glands of the Throat, is not attended with either Fever, Inflammation, or any great Difficulty of ſwallowing or reſpiring. The Real One is an Inflammation and Swelling of the *Larynx*, accompany'd with a Fever, a burning Heat in the Throat, difficult Reſpiration, Suffocation, and Pain in the Part; the Patient cannot continue lying, and all Liquids, as Broths and Drink, which he ſwallows, return thro' the Noſe.

But there are two Sorts of theſe Genuine *Quinſeys*, one External, the other Internal. The former is an Inflammation of the exterior Muſcles of the *Larynx*, in which the Throat ſeems more tumefy'd without than within, and then is leſs dangerous, becauſe the Tumour throwing it ſelf outward, does not preſs on the Paſſages of the Air, nor thoſe of the Victuals and Drink. The Internal conſiſts in an Inflammation and Inflation of the interior Muſcles of the *Larynx*, which are four ſmall ones, ſituate internally within the *Larynx*. Two of them are called *Arytænoides*, and the two others *Thyro-arytænoides*. Their Function is to ſhut the Arytænoide Cartilage, which is ſhap'd like the Snout of an Ewer. When theſe Muſcles are ſwell'd, they preſs the Cartilage ſo cloſe, that the Air not being able to paſs, the Patients are ready to be ſtifled: And 'tis this *Quinſey*, which for that Reaſon is adjudg'd mortal, and which requires our Help.

We ſuppoſe the Patient to have been plentifully blooded on the Arms, and alſo on the Jugular; that all the Medicines proper, and which are uſually preſcrib'd in this Caſe, in which our Buſineſs is to relax the Muſculous Fibres, and decreaſe the Effervеſcence of the Blood, have been try'd: Alſo that we are certainly ſatisfied that the Hindrance of Reſpiration depends on the *Larynx*, that the Patient has a ſufficient Share of Strength, that there is Room left to hope that by introducing of Air into the Lungs we may ſave the Life of the Patient, and that he would infallibly die without the Operation, on which both Parties unanimouſly agree. 'Tis to be perform'd in the following Manner:

Before the Operation, the *Apparatus* is to be diſpos'd, and laid in a Baſin or Diſh, which a Servant is to hold; then the Patient is to be plac'd to the beſt Advantage. Some will have him laid down for the Convenience of the Operator: Others pretend that he ought to be ſitting, in order to his breathing the freer during the Operation: Some place him half lying, with the Head leaning backwards, that the Neck may offer the fairer; and others oppoſe that Poſture, alledging, that it is the Way to make us ſtrangle the Patient, when the Neck is inflam'd, and there is a conſiderable Swelling on that Part. But we leave it to the Surgeon's Diſcretion to place his Patient in the moſt convenient Poſture for both of them. Then he marks the Place where the Orifice is to be made, which ſome will have to be betwixt the Firſt and Second of the *Bronchia*. When the Tumour is not large, and when the Throat is very much ſwell'd, they ad-

adviſe the opening it betwixt the Third and Fourth, to keep it at a Diſtance from the *Larynx*; but ſometimes that Part is ſo tumefy'd, or the Patient ſo fat, that by the Touch we cannot tell the Number of the Cartilages, in which Caſe we are to mark the Place an Inch below the *Larynx*.

In the Operation, the Surgeon is to pinch up the Skin at the Place mark'd before, and cauſe it to be held on one Side by a Servant, and on the other hold it himſelf with his Left Hand; then with a ſmall ſtraight Inciſion-Knife cut the Teguments at the Place mark'd as above, and having looſen'd them, he ſeparates with a Lancet the Muſcles *Sterno-thyroides*, which aſcend from the *Sternum* along the *Trachea*, in order to inſert themſelves into the Lateral Parts of the Cartilage *Thyroides*. Theſe Muſcles being ſeparated from each other, we diſcover the *Bronchia* of the *Trachea*, which are the Cartilaginous Rings plac'd and fix'd one above another, by their Union forming a Conduit continually open, which is call'd the *Trachea* or *Aſpera Arteria*. The Surgeon then takes a ſmall Inſtrument, call'd the *Bronchotomiſt*, or if that be wanting, an arm'd Lancet, wrap'd about with a ſmall Band, to hold it and its Handle firm; he ſtrikes it in betwixt two Rings, but not too deep, for fear of pricking the hind Part of the Windpipe. Before he draws out the Inſtrument, he introduces into the Orifice a *Stiletto*, which ſerves to make Way for the Entrance of a little Silver Pipe, which muſt be ſhort, leſt it reach to the Bottom of the *Trachea*, and bor'd through at the End, to leave Room for the Egreſs and Regreſs of the Air; beſides which, 'tis to be flat, to accommodate it to the Space betwixt the two *Bronchia*, and have two little Rings for a Riband to run through to faſten it to the Neck. When the Pipe is fix'd, the Air enters and iſſues out freely, and the Operation is finiſh'd.

Some will have this Operation perform'd by a ſingle Punction: We open the Skin, and the Space betwixt the Bronchial Cartilages, and we don't draw out the Inſtrument, before we have introduc'd a *Stiletto* in order to guide in the Pipe. Agreeable to this Method, the Buſineſs is ſooner done, leſs cruel, and the Orifice eaſier heal'd.

After the Operation, a ſmall Interval of Reſt is to be given to the Patient, in order to allow him ſome Breathing-time; then he is to be dreſs'd, by applying to the Orifice a little Bit of *Spunge* dip'd in hot Wine, and ſqueez'd before it is laid on. We are not to thruſt in any Cotton or Lint, leſt the Air ſhould force any Particles of them into the *Trachea*, which would occaſion a violent Cough, not unlike that which happens to thoſe on whoſe *Larynx* by Accident any Drop of Liquor falls, which is vulgarly called going the wrong Way. If the *Spunge* be too ſubtle, or too thick, ſo that the Air can ſcarce enter, it muſt be chang'd, or not at all apply'd, becauſe the ſole Incentive to the Performance of the Operation, is the procuring a free Paſſage for the Air. We are next to apply a Plaiſter, Bolſter, and Bandage, which is to be but moderately tighten'd, by reaſon that theſe Parts being nervous, and very ſupple, cannot poſſibly ſuffer any Reſtraint without being very much incommoded.

This Dreſſing *Apparatus* muſt not continue on above three or four Days; for in that Time the Patient is dead, or the Obſtacle which hindred the Entrance of the Air is remov'd, ſo that the Inflammation ceaſing, the Swelling abated, and the Air reaſſuming its natural Courſe, we are to take out the Pipe, and apply our ſelves to heal the Orifice. To this Purpoſe we cloſe its Lips with an Incarnative Bandage, which is perform'd by placing the Band to the Nape of the Neck, from whence 'tis advanc'd forwards, ſo that the Ends croſs each other on the Orifice, by which Means, and the Aſſiſtance of a Balſam laid on them, we endeavour to reunite theſe two Lips as ſoon as poſſible.

If Bandage proves vain, we are to make uſe of two or three Stitches with a Curve Needle, threaded with a Wax Thread; for we cannot make too much Haſte in the healing a Wound in the Windpipe, conſidering that the Air which enters by that Orifice, is look'd on as an Exotick Air, becauſe not modify'd and temper'd as it ought to be by the Mouth and Noſtrils, before it comes to touch a Subſtance ſo nice as that of the Lungs, which it may very much fatigue. This Cure, when in the Hands of a good

Sur-

Surgeon, is eaſily perform'd, by reaſon he proceeds in it methodically, and conſonant to the eſtabliſh'd Rules of the beſt Practice. Some Authors believe it to be difficult, and ſcarce poſſible. They alledge, that theſe Parts being Cartilaginous, cannot rejoin like the Carnous ones; but Experience utterly deſtroys this Argument. *Fabricius* affirms, that a Servant Maid, who had cut her Windpipe, was cur'd; and at *St. Germains* I dreſs'd a Man who receiv'd a *Piſtol-ſhot* at a Boar-hunting: The Bullet enter'd at the Right Side of his Neck, and came out at the Left, piercing the *Trachea*; notwithſtanding which I perfectly cur'd him.

The Contraction of the *Trachea* ſtops the Formation of the Voice, and is caus'd by an Inflammation that is within, or by Foreign Bodies that compreſs it without, or that it is ſtop'd or ſhut up by the Tumours that preſs inwardly upon it, by thick Flegm ſometimes that ſwell the Cartilages, by a Palſy that relaxes the Fibres of the ſame, or by the Convulſion of the internal Membrane of the *Trachea*, as it happens ſometimes to Hyſterick Women, and Hypochondriack Perſons. In this Diſeaſe one cannot breath, but ſpeak with Difficulty, and the Sick are in Danger of being choak'd, eſpecially when the *Trachea* is entirely squeez'd outwardly, or ſtop'd inwardly. When the *Trachea* is contracted wholly at once after a long Phthiſick, 'tis a Sign of Death, and ſhows that the Cartilages are totally dry'd and ſhrink for Want of Moiſture.

The Contraction of the *Larynx* comes uſually from a Tumour of the Muſcles of the *Larynx* and the Almond Glands, or extraneous Bodies that ſtick in the Folds of the *Larynx*, that ſtop the Paſſage of the Air, as it happens ſometimes in eating; for the Food paſſing over it, ſome Part enters into the *Larynx*, and the reſt falls down the Gullet. The *Epiglottis* becomes ſometimes rough, hard and inflexible, that is, loſes its Spring by the Dryneſs of its Fibres; for then the oily Liquor that ſhould moiſten it and make it ſupple, is wanting by the Obſtruction of the little Excretory Ducts. This Dryneſs alſo proceeds from the Heat of a Fever, that conſumes the Liquor that ſhould moiſten the *Epiglottis* and other Cartilages of the *Larynx*. In ſhort, it is very common to thoſe who have the *Small Pox*, becauſe the *Lympha* and all the nutritious Juices, are acrid, ſo that the Cartilages being penetrated by them, loſe their Contraction.

The Roughneſs and Unevenneſs of the *Trachea*, that is naturally ſmooth within, proceeds from a Dryneſs of the Moiſture that it ſhould have, or from the Acrimony of the nutritious Juice, or a ſaline Air, which makes the Voice rough, becauſe it meets with ſeveral Eminencies or Inequalities that hinder its Paſſage. This Diſeaſe cauſes a frequent Cough, that is very troubleſome, and gives great Pain to ſpeak. It is cur'd with more or leſs Eaſe, according as the internal Membrane of the *Trachea* is more or leſs corroded by the Sharpneſs of the Fluids. The *Aphonia* is when one cannot ſpeak at all, which happens through the Indiſpoſition of the *Larynx* in a Palſy or Convulſion. So Women cannot ſpeak in Hyſterick Fits, becauſe of the Convulſion of the Muſcles of the *Larynx*.

The *Ulcers* of the *Trachea* poſſeſs more or leſs Room in that Part, and come from the Obſtruction of the Glands and Excretory Ducts of the internal Membrane, that are occaſion'd by an acrid *Pus* that comes from an Ulcer of the Lungs. Though they do not appear in Sight, they are well enough known by the Pain they produce, and the ſpitting of Blood or *Pus*. Theſe *Ulcers* are difficult to cure, becauſe the *Trachea* and Lungs are always in Motion. When the *Trachea* is wounded, the Air paſſes through the Wound; they cough much, ſpit Blood, and feel a great Pain towards the Back, the Voice becomes hoarſe, and the Tongue dry. This Diſtemper is the more mortal, becauſe it is a Cartilaginous Part, and without Blood, therefore difficult to conſolidate. Beſides, the Cough irritates and increaſes the Wound.

Of

Of the Cure of Diſeaſes of the Trachea *and* Oeſophagus. *And firſt of the* Quinſey. *From* Michaelis, St. Hilaire, *&c.*

A *Quinſey* is ſometimes Malignant or Epidemical, which muſt then be treated with Bezoardicks and Refrigerating Medicines. In the Malignant Sort, Blood-letting is to be avoided if the Diſeaſe has continued a Day; but if there is no Malignity, Veneſection is highly neceſſary, particularly under the Tongue or Jugulars; But if it ariſe from Obſtructions of the *Menſes*, then bleed in the Foot or *Saphæna* Vein. Purging may be proper, if exhibited in the Beginning of the Malady. Repellers ſhould be cautiouſly adminiſtred, ſuch as *Lapis Prunellæ*, with Houſeleek Water, to abate the Inflammation. In all theſe Caſes *Sal Armoniack* is ſerviceable, with the Juice of *Houſeleek*, *Craw-Fiſh*, *Sal Nitre*, with *Antimony*, *Wood Sorrel*, *Spirit of Nitre*, &c. as thus: Take, of the greater Houſeleek, two Handfuls; Craw-Fiſh, ſix; ſtamp them in a Mortar, and preſs out the Juice.

As the *Quinſey* is a Tumour caus'd by the Acidity of the nutritious Juice in the Muſcles of the Throat, we ought to remove the Obſtructions by Volatile Medicines; but if the Tumour is conſiderable, and the Patient in Danger of being ſtrangled, we muſt inſtantly proceed to Blood-letting by the Lancet, or Cupping-Glaſſes; for Purgatives at this Time are pernicious. But if the Belly is hard, make a Fomentation of Mallows, Branch, Urſine and Camomil, boil'd together with an Ounce of *Mel Mercurialis*, the Yolk of an Egg, an Ounce of Oil of Lillies, and a Scruple of Nitre prepar'd with Antimony. Take, an Ounce of Sweet Almonds, with a Dram or two of Cream of Tartar, in Broth. A Gargariſm made with Water, or a Decoction of Elder Flowers, with a little Honey of Elder, is very good. Or Take, Plantane Water, three Ounces; Spirit of Wine, ſix Drams; Spirit of *Sal Armoniack*, twenty Drops; for a Gargariſm: Or a Decoction, of Elder Flowers, eight Ounces; Spirit of Wine Tartariz'd, two Drams; Honey of Roſes, half an Ounce.

To reſolve the Tumour, make uſe of Spirituous Liquors fill'd with Volatile Salts, Plaiſters and Liniments; as Spirit of Wine Camphorated, with two Drams of Volatile Salt of Urine diſſolv'd in a little Elder Water, and with freſh Butter made into a Liniment. For a Cataplaſm, uſe the following or the like: Take, Bread Crums, a Handful; Roots of *Althea* and Lillies, of each an Ounce; Roſe Flowers, half a Handful; Linſeed, ſix Drams; Fœnugreek, half an Ounce; boil all to a Pultiſe, and add ſix Drams of Oil of Sweet Almonds, as much Oil of Lillies, half an Ounce of Butter, a Dram of Saffron, and two Yolks of Eggs.

Of Ulcers, Wounds, *&c. of the* Trachea *and* Oeſophagus. *From the ſame Authors.*

FOR the Cure of Ulcers of the *Trachea*, Sudorifick Decoctions of the Woods may be us'd, adding to each Draught twenty or thirty Drops of the Tincture of Antimony; or Vulnerary Decoctions, as of Squills, *Paul's* Betony, Ground Ivy and Horehound. Wounds are to be treated in the ſame Manner, and in neither Caſe ought we to forget *Antimony*

Diaphoretick, Crabs-Eyes, or the Powder of the Claws, and at laſt to heal with Balſam of *Peru* or *Chio* Turpentine.

For Ulcers, Wounds or Pain in the Gullet, uſe the following Ointment, Gargariſm, *&c.* Take, a Pint of good Wine; Allum, half an Ounce; Frankincenſe, Maſtich, and Myrrh, of each half an Ounce; boil all, and add four Ounces of Spirit of Wine Camphorated; then boil again to the Diminution of a third Part, cool it, and keep for Uſe. This is a very efficacious Medicine for cleanſing the Ulcers, which are afterward heal'd with Balſam of *Capivy*, or elſe with Oil of Turpentine mix'd with Spirit of Earthworms and Camphire: Or externally make uſe of Balſam of *Peru*, with Oils of *St. John's Wort* and Turpentine.

Take, *Egyptiacum* and Honey of Roſes, of each a due Quantity; and a little Wax; make 'em up into an Unguent, which apply upon a Caruncle in the Gullet in order to conſume it, obſerving, that if it partake of any *Virus* from the *Small-Pox*, that you add a little *Red Precipitate*. For a *Gargariſm*, Take, Plantane Water, a Pint; Scabious, half a Pint; of Roſes, a Pint; Quince Seeds, two Drams and a half; boil all gently, and add to the ſtrain'd Liquor Syrup of Mulberries, two Ounces; ſeal'd Earth, a Dram; and make a Gargle for the Pain of the Gullet.

Againſt *Strumæ's* or Evils in theſe Parts, there are two Sorts of Remedies proper, Internal and External. The Internal, which are moſt commonly fix'd ones, in order to abſorb the vitious Acid that corrupts the *Lympha* of the Glands, are Burnt Spunges, Dried Bones, Pumice Stone, with Ginger, Pepper, Preparations of Vipers, *Arcanum Duplicatum*, Pumice Stone prepared, Sneezing Powders; proper Purgatives, in which *Turbith* and *Coloquintida* are us'd, *&c.* The External Remedies are ſuch as we ſhall ſpeak of hereafter.

Take, three Ounces of Sea Spunge Burnt; the Jaw of a Pike, Crabs Eyes, long Pepper, white Ginger, Egg Shells Calcin'd, of each an Ounce; make a Powder, whereof take half a Dram every Day for a Month together. *Sculletus* recommends an Electuary made of Powder of Lizards and Honey, to take the Quantity of a Nutmeg every Morning for a Month, drinking after it a Glaſs of the Decoction of the Roots of *Scrophularia*, *Filipendula* or Drop-wort, Bruſcus and common Broom. For an Unguent, Take, Oil of Bays, an Ounce; Ceruſe waſh'd in Spirit of Wine, a Dram; Roach Allum, half an Ounce; Salt of the Oak, two Drams; make an Ointment to apply upon the Part. Or Take, Radiſh and Savin Juices, with Vinegar, of each equal Parts; mix them well together, and apply Night and Morning. To make *Rulandus's* Plaiſter, Take, Goats Dung, Sulphur Vive, Linſeed and Radiſh Seed, of each equal Parts; boil 'em in Wine, and lay to the Part in Form of a Plaiſter to diſſipate the Swelling. Or Take, Sulphur, half an Ounce; *Sal* Gem or Nitre, of each two Drams; Litharge, one Dram; Parſnip Seed, two Drams; the Lute of an old Furnace, one Ounce; Verdigreaſe, a Dram; mix all together, with Oxymel and a little Turpentine, to make a Plaiſter.

To make a Liniment, Take, one Ounce of *Diachilon* Plaiſter of Mucilages, with as much Mercury kill'd with Spittle, and make a Liniment. Or Take, of Ointment Martiated, of Oil of Mint and Bays, of each half an Ounce; two Drams of Mercury kill'd with Flower of Brimſtone; make an Ointment. The Strumous Tumours and Glands are often taken away by Cauſticks either Actual or Potential, by applying Coroſives, *&c.* as Sandarch, Arſenick, Oil of Vitriol, Quick-lime with Soap, Hogs Lard and Sublimate Precipitate, and many others, that have Power to waſt the Gland, or take out the *Cyſtis*.

For Hoarſeneſs and Loſs of Voice, proper Evacuations are firſt to be us'd, as Purgeing, Bleeding, *&c.* as with *Crato's* Amber Pills, a Scruple; Reſin of Jalap, ſix Grains; with two or three Drops of Oil of Amber or Marjoram. Or, Cochy and the Gum Pills, of each twelve Grains; Scammony Sulphurated, four Grains; Balſam of *Peru* and Oil of Amber, of each two Drops. Or Take, Conſerve of Betony, half a Dram; the Catholick Purging Powder, a Scruple; Spirit of Lavender, ſix Drops; Syrup of Betony, *qſ.* For a Bolus, Take, of Pearl Barley, Raiſins in the Sun, of each an Ounce; Liquorice Roots, two Drams; Maiden-Hair and Hyſſop, of each half a Handful; freſh Pine Kernels, half an Ounce; boil 'em in a

Pint of Water, and to the ſtrain'd Decoction add an Ounce of Honey Clarified, and half an Ounce of Sugar Candy; drink a third Part of this three Mornings ſucceſſively. For a Lambative, Take, Oil of Sweet Almonds and Syrup of Violets, of each two Ounces; Oil of Sulphur by the Bell, twenty Drops; Sugar Candy, an Ounce; to be taken on a Liquorice Stick at Bed-time.

Of the Diſeaſes of the Breaſts.

THE principal Diſeaſes of the Breaſts, are Tumours, Inflammations, *Scirrhus*, Cancer, extraordinary Size, Chops, Ulcers, *&c.* In Tumours of the Breaſts, we ought to temper the Acidity of the Milk, and other Liquors, that are obſtructed in the Glands; for which we ought to give Sudorificks inwardly, as Chervil, Poppy and *Carduus* Water, Volatile and Fix'd Alcalious Salts, Crabs Eyes, Antimony Diaphoretick, *Sperma Ceti*, *&c.* and apply to the Part Compreſſes ſteep'd in Spirit of Wine Camphorated, mix'd with *Sal Armoniack*; and if the Tumour is hard, endeavour to diſſolve it with Plaiſter of *Hemlock*, *Diachilon*, and *Sperma Ceti*.

In the Inflammation of the Breaſts, make uſe of Diaphoreticks both internally and externally, to remove the Obſtructions, open the Veſſels, and qualify the Acids. If the Inflammation is conſiderable, and gives a great deal of Pain, make a Pultiſe with Bread Crums and Milk, Oil of Roſes and Sweet Almonds, a little Saffron, *Storax*, and *Sal Armoniack*. If it tends to a Suppuration, Take, Mallow Leaves, *Althea*, and Violets, of each a Handful; White Lilly Roots, an Ounce; Leven, half an Ounce; bruiſe all together, and boil them with Hogs Lard, to which add four Figs, and a little Saffron, to make a Pultiſe. Or Take, an Ounce and a half of *Ammoniacum*, with as much *Laudanum* and Ointment of *Baſilicon*, ſix Drams of Roſin, two of Oil of *Guajacum* or Oil of Wax, and half an Ounce of Myrrh and Saffron; with which make a Suppurative Cerate.

If the Tumour of the Breaſts is *Scirrhous*, then give the more penetrating Volatile Salts, as that of Vipers, *Sal Armoniack*, Tincture of Antimony; and put upon the Breaſt Plaiſter of Sulphur of *Ralandus*, that of *Vigo* with Mercury, and a Cerate made with two Ounces of Wax, three Drams of Tincture of *Galbanum*, a Dram of *Laudanum*, three Drams of *Sperma Ceti*, ſix of Cummin Seed, with as much Sage Powder. If it becomes Cancerous, there is no other Remedy but Manual Operation; for the *Cancer* not yielding to Medicine, the Parts ſmall, and the Patient ſtrong and not inclinable to a Cachochimy, there is nothing to be done but to proceed to Extirpation, the Methods whereof you will find in Dr. *Verduc* and Mr. *Dion*'s Treatiſes of Surgery. The little Ulcers of the Breaſt are heal'd with a Plaiſter of *Sperma Ceti*, with Ointment of *Tutty Pompholigos*; and the Chops of the Nipple, *&c.* by an Unguent made with Mucilages of Quince Seed, Deer Suet, and Camphire. The Oil of Eggs does Wonders on theſe Occaſions, with Oil of *St. John's Wort*, Wax, *Pompholix*, *Nutritum*, *&c.*

To prevent the abounding of Milk, and its Coagulation in the Breaſts, you muſt make uſe of all thoſe Internals which abate Seed in Men, beſides Topicks to ſuppreſs or put a Check to the Spring of Milk in the Breaſts; for which Purpoſe are uſed Decoctions of Mint, *Agnus Caſtus*, Roſemary, Chervil, Dill, Cummin, *&c.* Take, Sage, Periwinkle, Hemlock, of each a good Quantity; expreſs the Juice, and diſtil a Water from it, in which dip Linen Rags, and apply to the Breaſt. Or Take, Fennel, Parſly, and all the Mallows, with their Roots, of each a Pugil; Bay Leaves, Camomil Flowers, of each half a Handful; boil them in Water, and foment the Breaſts. A Pultiſe of Bread Crums, Mint Powder'd, Vinegar, and a little Salt, is good.

Spirit of *Sal Armoniack*, *Sperma Ceti*, Crabs Eyes, with a little Myrrh, and *Millepedes* in Powder, which deſtroy the Acids, are proper,

per, taken inwardly, againſt the Coagulation of the Milk; as likewiſe are the Seeds of Fennel and Cummin, Saffron, Sage, Mint, and Chervil. The large Radiſh cut ſmall and infus'd in the Sun ſome Days with Oil, is a very good Remedy; and ſo is a Fomentation made of Vinegar and Juice of Plantane.

As to Wounds of the Breaſt, ſome do not penetrate into the Cavity thereof, and then they are regarded but as ſimple ones; others are penetrating ones; and of theſe laſt ſome are without Hurt of the internal Organs, in which Caſe they require no more than reuniting; and others are with Hurt of the contain'd Parts, and thoſe, either without ſhedding of Blood in the Breaſt, or attended with Blood, run into that Middle Region. 'Tis of theſe laſt we ſhall treat in ſpeaking of the *Empyema*. One of the Duke of *Burgundy*'s *Gendarmes* (ſays Mr. *Dion*) was wounded at *Beffort* in 1703. by one of his Comrades, who gave him a Thruſt with the Sword in the Breaſt, directly under the Right Pap; which Misfortune happening to the Patient about half a League from this City, the Breaſt had all that Time to fall before I was call'd to dreſs it. I contented my ſelf with dilating the Wound ſufficiently to evacuate the Blood which choak'd it up, without dreſſing it the firſt Day, but oblig'd the Patient to lie upon it the whole Night, and the faſter the Blood iſſued out, the freer he reſpired. The next Day I found the Breaſt perfectly emptied, when I dreſs'd it, and left him in the Hands of a Surgeon of that Town, who ſo well cured him, that a Month afterwards he came to us at the Army.

Of the Diſeaſes of Pleura, Mediaſtinum, Thymus, *and* Pericardium.

THE moſt common Diſeaſes which happen to the *Pleura* and *Mediaſtinum*, are Inflammations, Abſceſs, *&c.* The Pleuriſy is an Inflammation of the *Pleura*, caus'd by a ſerous and impetuous Blood, which extravaſates and clots in that Membrane. Some, from the Stimulations which the Patient feels, will have it produc'd by an inflam'd Bile, which gathering betwixt the Ribs and the *Pleura*, is always accompanied with an acute Fever, a thick or frequent and difficult Reſpiration, and a ſharp, pricking and internal Pain. The *Greeks* call it *Pleuritis*, from the Word *Pleuron*, which ſignifies the Side, becauſe it violently afflicts the Patient on the Side of the Breaſt.

The *Peripneumonia* is an Inflammation of the Lungs, excited by the Settlement of a purulent Matter which ſucceeds the Fluxion of the Breaſt, and whoſe Signs are a frequent and weak Reſpiration, accompanied with a Fever, and Redneſs of the Face. The Word *Peripneumonia* is deriv'd from *peri* about, and *Pneumon* the Lungs, by reaſon that this Diſtemper forms it ſelf in the Membrane which envelopes the Lungs.

Theſe two Diſeaſes are very violent, and diſpatch their Patients in a ſhort Time, when the Humour which occaſions a Pleuriſy is contain'd within the *Pleura*, and that which cauſes the *Peripneumonia* in the Subſtance of the Lungs, or their Membranes. Theſe two Diſeaſes are under the Juriſdiction of the Phyſicians, and go beyond the Cognizance of the Surgeon, who is allow'd to know no more than that they require frequent Bleeding, of which he cannot be ignorant, becauſe he executes the Phyſician's Orders: But when this morbifick Matter comes to an Abſceſs, and the *Pus* is run into the Breaſt, they are ſubjected to Surgery, becauſe there is no other Way of evacuating them but by the Surgeon's Hand. It depends on him to examine, before he attempts the Operation, whether 'tis certain that there is any Matter in the Breaſt, that he may not fall into the ſame Fault which was committed by a Surgeon, and beſides a very able Man, who perform'd the *Empyema* on the Duke of *Mortemart*, and found nothing in his Breaſt. He might reaſonably alledge, that the Operation was preſcrib'd, and all the Relations

desired it; but he was blam'd by all the World.

The Signs which indicate that an Abscess is forming in the *Pleura*, are, an Inflammation, a violent and piercing Pain, which attacks the Patient all at once, a Heaviness, a slow and continued Fever, accompany'd with cold Fits, a hard Pulse, uneven and deep, a dry Cough, attended with Thirst, and a pressing Difficulty of Breathing. The Signs which inform us that the Abscess is in the Substance of the Lungs, are, that the Patient feels a fix'd and dull Pain, which comes only by little and little, he cannot breath without Pain, the continued Fever and immoderate Thirst don't leave him, his Spittle is purulent, his Eyes are sunk in, his Cheeks of a Vermilion Red, and his whole Body become and subject to an *Atrophy*. The Signs which advertise us that the Abscess, whether in the *Pleura* or in the Lungs, is broken, and that the Matter is fallen on the *Diaphragm*, are, a Diminution of all the Symptoms for some Time, the Pain is really not so sharp, inclining towards the Bastard or Short Ribs, and the Patient finds some Relief: But the supervening Symptoms are not less dangerous than the former; for besides the Difficulty of Breathing, the Pulse rises, the Fever augments and becomes ardent, the Patient is afflicted with a great Inquietude, and a fluctuating Weight on the *Diaphragm*; he cannot bear lying unless on the Side affected; for if he lays himself on the opposite Side, he feels a sharper Pain, and a much heavier Weight, caus'd by the Matter which loads the *Mediastinum*; when he is to have Recourse to Operation, as the sole Way by which he can possibly be cured.

In order to prepare an Issue for this Matter, there are two Ways of opening the Breast; one by Incision, and the other by *Caustick*s, otherwise call'd a *Potential Cautery*; for as for the *Trepan* or *Modiolus* on the Side, and the Actual Cauterizing, propos'd by some Authors, they are too cruel Methods to be us'd. The Orifice made in the Breast by Incision, in order to draw out the *Pus*, is like that open'd for the Evacuation of the Blood, which I have just describ'd, and therefore it is not necessary to repeat it here. The second Way of performing the *Empyema* is by Caustick or the *Potential Cautery*.

In the *Empyema* perform'd on account of a Wound in the Breast, we make use of a Linten or Linen Tent; but in that perform'd on occasion of the Rupture of an Abscess, we insert a Silver Pipe, the Orifice of which we stop with a small Stopple, in order to let out as much, and as little, of the *Pus* as we think proper; to which End the Incision is to be made of a proportionable Size to that of the Pipe, which must take up the whole Aperture, and be provided with a Head, to prevent its slipping into the Breast, and two little Holes, through which to run a String that is to go round the Body, that the Pipe may not come out at any other Time than when the Operator pleases. When the Ribs are too close, the Body of the Pipe must be flat, to adjust it to the Spaces betwixt those Bones, and open for the Space of its whole Length, as well as at the Side of its external Extremity, that the *Pus* may run off with the greater Ease.

Every Time we dress the Patient, we pull out only the little Stopple which stops the Aperture of the Pipe; and after having drawn it out, if the *Pus* don't come out, we must with a large blunt Probe push back the Lungs, which leaning against the End of the Pipe, hinder the dress'd Evacuation. The Injections made by the Syringe being enter'd through the Cavity of the Pipe, we stop it for a Moment; then taking out the Stopple, if the Patient incline his Body never so little that Way, they issue out at the same Passage. These Injections are necessary to wash the Breast with some Mollifying and Detersive Liquors, as Scabious and Colt's-foot Water, Vulnerary Decoctions, *&c.* to which may be added Wine wherein Honey of Roses is dissolv'd.

There sometimes gathers in the *Thorax* a serous Humour, which distilling by slow Degrees, fills one of its Cavities, and frequently two together. This is what we call the Dropsy in the Breast, which is caus'd, as is that of other Parts of the Body, either by the Rupture of some Lymphatick Vessel, or by a Deficiency of Fermentation, which renders the Humours too watry, or hinders the Separation of the *Lympha* by the Urinary Passages and other Ways. This Disease is known by a dry Cough, with which the Patient does not spit, by cold Fits, a slow Fever,

Fever, Shortneſs of Breath, the Swelling of the Legs; and above all, by a Fluctuation and Gargling which is heard in the Breaſt, when the Patient moves himſelf, to make a Noiſe like that of a Veſſel half full when ſtirred. If the Patient can only lie on one Side, 'tis a Sign that there is Water on that Side only on which he can bear lying; but if there be as much Pain in lying on one Side as the other, and that he chuſes to lie on his Back, there is Water in the two Cavities of the Breaſt.

The Evacuating of this Water muſt be attempted by *Hydragogues*, that is, *Sudorificks*, *Aperitives* and *Diureticks*, all which tend to the Evacuation of Seroſities, and of which I have ſpoken in the Dropſy of the Belly; and when theſe Remedies, which expel them by Sweats, inſenſible Tranſpiration, and Urine, prove unſucceſsful, we proceed to the Aperture of the Breaſt, as has been already ſhewn you.

Fiſtula's in the Breaſt ſucceed Wounds in that Part, and how careful ſoever the Surgeon may be in endeavouring to prevent thoſe Wounds becoming Fiſtulous, frequently he cannot help it. The moſt able Practitioners have always look'd on them as a Rock, on which ſeveral have ſplit, by reaſon of the almoſt unſurmountable Difficulties which occur in the cicatrizing of thoſe Wounds. But a Surgeon muſt never be diſcouraged; he ſometimes ſurmounts them at the very Time when he durſt not hope to ſucceed: He muſt make uſe of his utmoſt Application to find out the Obſtacles to a Cure, and ſpare no Pains in the overcoming them. If after an *Abſceſs* of the *Lungs*, the too plentiful Suppuration feeds the *Fiſtula*, the Source muſt be exhauſted; which is done by a good *Regimen*, general Remedies, and the Advice of a prudent Phyſician. If the *Sinus* comes from the Bones of the *Sternum*, or ſome near or diſtant Part, the Surgeon in this Caſe is furniſh'd with an Opportunity of ſhowing his Induſtry in the Invention of Remedies and Inſtruments, by which the Obſtacles to his Cures may be diſcover'd and remov'd.

The *Thymus* is ſubject to Tumours and Inflammations, caus'd by an acrid and viſcous *Lympha*, which ſwells it up, and enlarges it extraordinarily, and which occaſions a Strangling or Suffocation, which is more frequent to Women troubled with Hyſterick Fits. The *Pericardium* is contracted ſometimes from an Inflammation which is communicated to it by the *Mediaſtinum*, that is ſeiz'd with the ſame Indiſpoſition; and when they feel a Heat, and more violent Pain, they fall into a *Syncope*. This Diſeaſe is more dangerous than the *Pleuriſy* and *Peripneumonia*, and commonly is mortal, becauſe of its Nearneſs to the Heart, and is hard ſometimes, that the Patient dies Phthiſicky. It is obſervable, that the *Pericardium* is ſometimes wanting, and then they fall into the *Syncope*, and in the End die. It is likewiſe obſervable, that the Water contain'd in the *Pericardium* is ſometimes in ſuch large Quantities, that it occaſions a Palpitation of the Heart; and when it is wanting any conſiderable Time, it then follows there is a Dryneſs of the Heart, and a Phthiſick. Or the Want of this Liquor proceeds from a Wound, an Abſceſs, or ſome Solution of Continuity that the Heart ſuffers, ſo that the Fluid cannot be contain'd therein. Practitioners nevertheleſs obſerve, that this, tho' diſcharg'd by Wounds of the *Pericardium*, ſhall be gather'd afreſh after the Cure and Healing of the ſaid Wound, ſo that the Patient ſhall be reſtored to Health again.

The Cure of the Pleuriſy, Peripneumonia, Palpitation *of the* Heart, Syncope, *&c. that are Diſeaſes of the* Pleura, Mediaſtinum, Thymus, *and* Pericardium.

THE Cure of the *Pleuriſy* conſiſts in diſſolving the Blood that was thicken'd by the Acid, and reſtoring it to its natural *Craſis* and Circulation, by aſſiſting its Motion, inducing gentle Sweats or Spitting, and at laſt procuring Suppuration. Bleeding muſt be us'd at the Beginning of the Diſeaſe as the ſafeſt Courſe, notwithſtanding all the Pre-

Pretences in the World to Specificks, and eſpecially if there be a *Plethora* or Redundance of Blood, and the Diſtemper be acute. To make a Revulſion, open a Vein in the Foot in the Aſcending *Pleuriſy*, and in the Arm upon a Deſcending *Pleuriſy*; and to make a more particular Revulſion, always bleed on the oppoſite Side to the Pain.

A Benign or Kindly *Pleuriſy* is cured eaſier and happier without Bleeding. For the Malignant and Epidemical Kind, bleed not at all; for *Bartholett* aſſures, after a long Practice, that thoſe who are bled in a *Malignant Pleuriſy*, all die; and that thoſe who are not bled, eſcape. After Bleeding, we paſs to Specificks or Antipleureticks, to reſolve the grumous or coagulated Blood, and bring it to its natural Motion; in which we ought to obſerve Two Things: Firſt, That the Specificks are the ſame in the *Pleuriſy* as the *Dyſentery*: In the next Place, That all the Specificks in the *Pleuriſy* are againſt all Inflammations of the internal Parts proceeding from an internal Cauſe; for all theſe Inflammations are of the ſame Nature, to wit, *Eryſipelatous*.

Take, cold drawn *Linſeed Oil*, three Ounces; Syrup of *Scabious*, *qſ.* give this in a Malignant Caſe. Or, Sweet Spirit of *Nitre*, a Spoonful, in *Carduus* or Treacle Water: Spirit of *Sal Armoniack* Succinated, twenty Drops every Hour, in *Scorzonera* Water, or a Diſh of Bohee Tea. An Ounce of *Manna* diſſolv'd, and mix'd with Oils of Linſeed and Sweet Almonds, is very proper.

Take, *Sal Prunella*, two Drams; Powder of Corn Poppy and Red Coral, of each a Dram; Sugar of Violets, half an Ounce; mix, and give half a Dram frequently in Poppy Water. Or the following Emulſion: Take, Chardon and Poppy Seed, of each two Drams; Corn Poppy Water, as much as will ſuffice for a Draught; make an Emulſion; to which add, Boor's Tooth, the Jaws of a Pike prepar'd, and Antimony Diaphoretick, of each half a Scruple; ſweeten with fine Sugar.

Take, Hyſſop Leaves, two Handfuls; Squills, one Ounce; boil them; and then take ſix Ounces of the Decoction, and put to it one Ounce of Syrup of Marſh-mallows, and half an Ounce of Oxymel of Squills. This will procure an Expulſion of the purulent Matter contain'd in the Cavity of the Breaſt. Or Take, freſh Stone-Horſe Dung, four Ounces; a Pint and half of *Carduus* Water; infuſe them in a Veſſel cloſe ſtop'd two Hours; then filter the Liquor, and add, Syrup of Succory, two Ounces; Spirit of *Sal Armoniack* or Tartar, a Dram; give five or ſix Spoonfuls three or four times a Day. This is good either in the *Peripneumony* or *Pleuriſy*.

Sylvius's *Mixture*: Take, Parſly and Hyſſop Water, of each two Ounces; Fennel, one Ounce; Crabs Eyes and Bezoar Mineral, of each a Scruple; Treacle Water, one Ounce; Extract of *Laudanum*, four Grains; *Sal Armoniack*, half a Dram; Syrup of Red Poppy, one Ounce; make a Mixture for four Days.

For a Liniment, Take, Ointment of *Althea*, two Ounces; *Sperma Ceti*, half an Ounce; Oil of Sweet Almonds, one Ounce; Spirit of Wine Camphorated, half an Ounce; Oil of Amber, twenty Drops; make a Liniment to foment the Part. Or uſe the following Fomentation: Take, Spirit of Wine, ſix Ounces; Camphire, two Drams; infuſe 'em till the Camphire is diſſolv'd; then add a Dram and half of Yellow Sanders; dip a hot Cloth in this, and rub or apply to the Part to remove the Pain. Or, the Plaiſter of *Mucilages*, malax'd with Linſeed Oil, is very Anodine. When the *Pus* flows in the Cavity of the Breaſt, two Ounces of Syrup of Ground Ivy, with a few Drops of Oil of Turpentine or Sulphur, may be given from Time to Time to cleanſe and conſolidate. When the Matter of the *Empyema* cannot be evacuated by any internal Means, we muſt have Recourſe to Manual Operation, as ſhown before.

In the Palpitation of the Heart, and the *Syncope*, the following Things are of Uſe; as Tincture of Coral, Spirit of Hartshorn, Eſſence and Spirit of Balm, with Wine, Cinnamon Water, Borage, and the Cordial Water of *Saxony*. Outwardly may be us'd Oils of Balm, *Carduus* and Citron, from which three is made the beſt Cardiack Balſam. Confect of Hyacinth, and the Bone in a Stag's Heart, is good, with Pearl, Hartshorn, and Cinnamon Water, eſpecially where there is any Malignity. If the Palpitation of the Heart ariſe from the Green Sickneſs, or other Uterine Diſaffections, then Cordials are not ſo

ſo proper, but Chalybeates and Phyſical Wines, with Filings of Steel, *&c.* If from the Worms, Specificks of that Kind muſt be adminiſtred: And from Fear, or a ſudden Fright, Blood-letting is the beſt in order to recal the Blood from the Heart, where it overpowers it; for Experience informs us, that ſeveral have periſh'd in that Condition for Want of the ſudden Aſſiſtance of Bleeding. In a *Deliquium* of the Spirits, give this: Take, Cinnamon and Balm Water, of each two Ounces; Confect of Alkermes, one Dram; Syrup of Borage, four Drams; the Bone of a Stag's Heart, twelve Grains: Or, Cinnamon and Borage Water, of each an Ounce; the Cordial Water of Saxony, two Ounces; Magiſtery of Pearl, two Scruples; Syrup of Oranges and Lemons, one Ounce. Or you may give the Quantity of a Cheſnut of the following Electuary: Take, Conſerve of Balm or Borage, one Ounce; Pulp of Citron, ſix Drams; Confect of Alkermes, two Drams; Confect of Hyacinth, one Dram; Spirit or Eſſence of Roſes, twenty Drops; Oil of Cinnamon the beſt, ſix Drops. If a Fainting happens from too much Loſs of Blood, nothing ſucceeds better, according to *Horſtius*, than a little Salt put into the Mouth, or to rub the Tongue with it. If a Fainting proceeds from too violent Purging, or the like, the beſt Reſtoratives are, Treacle and Cinnamon Water mix'd together, or a Plaiſter of *Venice* Treacle applied to the Belly, or a Clyſter of it in Hartshorn Water, called the White Drink, eſpecially if the *Scorzonera* Root has been boil'd in it.

Of the Diſeaſes of the Lungs, *and their Cures. From* Sydenham, Morton, Michaelis, Floyer, St. Hilaire, *&c.*

THE principal Diſeaſes which attend the Lungs, are Wounds, Ulcers, Phthiſicks, *Aſthma's*, Coughs, Spitting of Blood, *&c.* If there be a Wound in the Breaſt, the Surgeon is to conſider, whether it has penetrated deep enough to reach the Lungs, and whether there be any Blood ſpilt in the Breaſt, of which he will be inform'd by Three Particulars: 1. The Situation of the Wound; 2. The Excretions; 3. The Accidents or Symptoms which accompany it. If the Wound is large, and there iſſues out a great Quantity of Blood, 'tis a Sign that it muſt have ſome in the Cavity; and chiefly when the Surgeon hears a hiſſing Noiſe at the Orifice, caus'd by the Air which comes out of it, that denotes a Wound in the Lungs, which being full of Veſſels, cannot be wounded without the Aperture of ſome of them, which pour the Blood into the Breaſt.

We diſcover the Effuſion of Blood by the Accidents which happen immediately after the Wound: We find a heavy Weight lying on the *Diaphragm*, caus'd by the Ponderoſity of the Blood which is there ſpilt; a ſtrong Tenſion of the Breaſt about the Wound; the Patient can ſcarce breath, and frequently falls into a *Syncope*. If by reaſon theſe Signs don't appear, the Surgeon concludes that there is no Effuſion of Blood, he muſt endeavour to cure the Wound as faſt as he can; and though he be never ſo careful, that will not be accompliſh'd ſo ſoon as is to be wiſh'd, becauſe Wounds on the Breaſt are more difficult to cure than others, for theſe Reaſons: 1. Becauſe of the Entrance of the Air through the Wound without being modify'd or warm'd, as that is which paſſes through the Mouth, which muſt unavoidably incommode the Lungs; 2. By reaſon that the continual Motion of the Breaſt oppoſes and obſtructs the Reunion which ought to be made: The Third conſiſts in the Difficulty of conveying Medicines to a Wound of the Lungs: And the Fourth is, That the Matter has not a free Paſſage to come out of it ſelf, and is not drawn out without Trouble when at the Bottom of the Breaſt, as is taught in the Operation of the *Empyema*.

As to internal Medicines in Wounds of the Lungs, Care muſt be taken not to neglect the Vulnerary Drinks, with proper Specificks,

cificks, as Ground Ivy, *Veronica, &c.* likewiſe Sulphur of Vitriol, *Fernelius*'s Syrup of Comfry, Lohoch, and Juice of Scabious and Comfry, Syrup of *Chervil*, Spirit of *Vitriol*, with Gum *Ammoniacum*; and eſpecially Balſam of *Peru*, with the *Lac* and Balſam of Sulphur.

The *Aſthma* is a Difficulty of Reſpiration, without a Fever, and is either Continual or Periodical, and in Proportion as it is greater or leſs, we give it different Names; calling that which is the leſſer, a *Dyſpnæa*; and the other, which is more violent, ſo that in order to breath the Patient is forc'd to be ſet upright, with his Arms lifted up, and his Breaſt extended, we call *Orthopnæa*. *Van Helmont* and *Willis* divide the *Aſthma* into the Moiſt or Dry *Aſthma*, or otherwiſe a Manifeſt or Occult *Aſthma*. The Manifeſt or Apparent *Aſthma* is the Moiſt One, occaſion'd by ſome vicious Matter, and which ceaſes with the Expulſion of that Matter. The Occult or Dry One, is that which without any vitiated Matter happens from a Convulſion of the Muſcles of the *Thorax*, and particularly of the *Diaphragm*.

In the Apparent *Aſthma*, the offending Cauſe is oftentimes in the Lungs themſelves, and very often in the Stomach, without finding Fault with the irregular Circulation of the Blood. The Moiſt *Aſthma*, proceeding from the Fault of the Lungs, is when the groſſer, viſcous and mucilaginous Juices, call'd by ſome the Viſcid Pituit, which come from the Fault of the Air, and thoſe Things that are breath'd in with the Air, that ſtick to the *Bronchia* of the Lungs, hinder the Entrance and the Flowing of Air, and by that Means interrupt the Dilatation and Conſtriction of the Lungs.

The corrupted Juices ariſe partly from the Defect of the *Lympha*, that moiſtens conſtantly the *Trachea*; for that being deſtroy'd by the inſpir'd Air, it is manifeſt that they become pernicious to the Lungs; and partly from the Defect in the Nutrition of the Lungs, when its Aliment is chang'd into a viſcous and mucilaginous Juice, as it happens frequently to ſuch as work in Mines and Metals, eſpecially *Mercury*, whoſe malignant Fumes they draw in with the Air, which immediately ſpoil Digeſtion, and conſequently the Nutrition of the Parts. Phthiſicky People are commonly *Aſthmatick*, becauſe of the *Pus* that floats in the Cavity of the *Thorax* in the *Empyema*, or that drowns the Sides of the Lungs. The *Serum* being too plentiful, makes the Blood too fluid, and occaſions the *Aſthma*. For this Reaſon the Suppreſſion of accuſtom'd Evacuations produces a great many *Aſthma's*.

It is not only the *Serum*, but the Blood being hindred in its Circulation, and ſtopping in the Veſſels of the Lungs, produces a ſuffocating Catarrh, when the Maſs is conſiderable; whence it comes, that after Running, or any violent Exerciſe, we naturally become Aſthmatick; becauſe the Blood, that circulates ſwiftly in other Parts, cannot paſs at that Rate through the Lungs from the Right Ventricle of the Heart to the Left, but preſſing with Difficulty through, produces an *Aſthma*, becauſe the Lungs have not Liberty to expand or ſtretch themſelves ſufficiently. And this is the Reaſon why Women who have a Suppreſſion of their Terms, and Men that of the Hæmorrhoids, together with Cachectick People, ſhould be ſubject to the *Aſthma*, and a Difficulty of Breathing: For in the firſt Place, the Retention of Blood is made in the Lungs, and ſtops the Circulation, which is prov'd or confirm'd by the Spitting of Blood, which is common in a Suppreſſion of the *Menſes* or *Hæmorrhoids*. In the laſt, or Cachectick Habits, there is another Reaſon; for their Blood is too crude, being half Chyle when it enters the Lungs; and therefore when circulated ſlower than uſual, it ſtops and clogs up the Lungs, and ſo brings on an *Aſthma*. We may likewiſe obſerve, that great Terror, or a Fright, will raiſe an *Orthopnæa* by a like Stoppage of Blood in the Lungs, according to *Foreſtus*, who takes Notice of a mortal *Orthopnæa* occaſion'd thus.

The Blood, or ſome other Matter coagulated or ſtagnating in the Left Auricle of the Heart, or in the Lungs, produces a mortal *Dyſpnæa*. *Riverius* ſays, that he found in a Man who died of a Difficulty of Breathing, the Left Ear of the Heart full of a viſcous and coagulated Matter, that had ſtop'd the Circulation. The drinking of cold Waters, and bathing in them during the hot Weather, ſometimes beget the *Aſthma*. The Reaſon is, becauſe the Blood being extreme-

ly attenuated, diſſolv'd, and render'd too fluid, by the Exceſs of Heat or Motion, coagulates the ſooner by drinking cold Liquors, or applying Cold externally, eſpecially to the Breaſt; which Coagulation is ſucceeded by a Stoppage of the Blood's Motion, and that conſequently by an *Aſthma*.

We may obſerve, that the Blood, or other vitious Matter in the Lungs, that are the Cauſes of the *Aſthma*, do not flow from the Head, as the Ancients falſly believ'd, but are brought only by the Arteries immediately with the Blood, or mediately by the Degeneration of the Aliment, or by the Alteration of the *Lympha*. The ill Conformation of the *Sternum* and the Falſe Ribs, contribute much to the Generation of the *Aſthma*; and we know that crooked People are uſually Aſthmatick, becauſe the Spine of the Back being irregular, hinders the Expiration of the Lungs.

It remains, that the Moiſt *Aſthma* diſcovers it ſelf to be more in the Stomach than the Lungs; for the more the Stomach of Aſthmatick People are found ſtuffed with a groſs, viſcous and mucilaginous Matter, that being agitated from what Cauſe ſoever, it begins to ſwell and extend it ſelf, and ſo produces a very dangerous *Aſthma*; partly becauſe the too great Diſtention of the Ventricle hinders the Motion of the Diaphragm downwards, which is very neceſſary; partly becauſe the Diaphragm participates by Conſent with the Irritation of the Stomach, from whence follows the Convulſion and perverted Motion of the firſt; ſo that it is evident there are a great many more Moiſt *Aſthma's* proceed from the Fault of the Stomach than the Lungs. Scorbutick and Hypochondriack Perſons are, after Eating, troubled with great Difficulties of Breathing, which proceed from nothing elſe but an ill Digeſtion, that procures Abundance of Wind.

The Occult or Dry *Aſthma*, which begins and ends its Paroxyſm ſuddenly, and without any ſenſible Cauſe, is, according to *Lindanus*, the Spaſm or Convulſion of the *Diaphragm*, and other Muſcles of Reſpiration; which clearly appears, becauſe Aſthmatick People of this Kind complain of a Contraction in the Nature of a Girdle, which draws round where the *Diaphragm* is tied to the Parts; for the other Muſcles of the *Thorax*, that is, thoſe that ſerve for Inſpiration, ſuffer Convulſions; and thoſe that ſerve for Expiration (he ſays) is the ſame Thing, and the *Aſthma* always remains, but moſt frequently from a Convulſion of the firſt. The Cauſe of the Convulſive *Aſthma* is ſeated in the Nerves, and particularly in the *Par Vagum* and the *Intercoſtals*, or in the *Abdomen*, or principally in the Brain.

When the Nerves are ſeiz'd in the *Abdomen*, eſpecially in the *Plexus* of the Meſentery, in thoſe of the Spleen, and other Nerves which correſpond to the *Par Vagum* and Intercoſtals, they feel Gripes in the *Abdomen* or Vermicular Motion, or the Left *Hypochondria* is diſtended with other like Signs; for in Hyſterick Women, and Hypochondriack Men, there is a Concourſe of ſeveral Symptoms. When the Nerves of the Brain are ſeiz'd, we do not perceive any ill Symptoms in the *Abdomen*; the Patient is affected with a *Vertigo*, or the like Indiſpoſition, which declare the Spirits are diſturb'd. That which affects the Nerves, according to *Willis* and *Etmuller*, is ordinarily a vitiated Acid, and particularly a ſharp *Lympha* collected in the *Plexus* of the *Abdomen*, or ſome other Parts, that occaſions theſe Diſorders; but whether it is in the Brain, or the Parts about the *Plexus Choroides*, it is of no Moment, ſince the Nerves are irritated, and Convulſions rais'd.

The Convulſive or Dry *Aſthma* is ſometimes Hereditary, like the *Epilepſy*, and other Convulſions that are deriv'd from the Parents to the Children. There is a Periodical *Aſthma*, which comes by Intervals, eſpecially in the Night, of which we meet with ſeveral Examples in Authors. In the Moiſt or Apparent *Aſthma*, if the groſs Humour is in the Lungs or the *Bronchia*, the Reſpiration is difficult, with Noiſe and Coughing, and the Diſorder ceaſes as ſoon as the Pituit or Flegm is evacuated. In ſhort, the Signs to diſtinguiſh the Convulſive or Occult *Aſthma* from the Apparent are remarkable, to wit, 1. If the Diſorder begins in the Head, the *Vertigo* precedes or accompanies the Convulſive *Aſthma*; if the Root of it be in the *Abdomen*, Gripes and Trembling are the Forerunners, which is not to be met with in the Apparent *Aſthma*. 2. When the Fault is in

the Lungs, or the Ventricle, that is to ſay, when the *Aſthma* is moiſt, it is continual; and after having been once cured, if it returns, it is ſucceſſively; whereas the Occult *Aſthma* goes away ſuddenly, and returns again as ſudden. Thoſe who are Aſthmatick by Convulſion, generally draw in or inſpire much, but expire little, when the Muſcles that ſerve them for Expiration are convuls'd. The contrary happens in the Moiſt *Aſthma*, where in the Fit they cannot reſpire at all.

The Convulſive *Aſthma's* are without any Humour, without any Ratling in the Throat, Cough, or Expulſion of Matter, except a little Spitting towards the End of the Paroxyſm: In a Moiſt *Aſthma* the contrary happens; for they caſt out plentifully, and with Relief. All Sorts of *Aſthma's* are dangerous, but the Occult more ſo than the Apparent or Manifeſt. Inveterate *Aſthma's* are ſeldom perfectly cured, but return upon the leaſt Diſorder imaginable. An *Aſthma* that ſucceeds an acute Fever, is full of Danger; and *Riverius* ſays, that the *Pleuriſy* or *Peripneumony* that follow an *Aſthma* are mortal.

If either of thoſe Diſeaſes attend the Sick during the Time that he is afflicted with the *Aſthma* or an acute Fever, we have great Reaſon to fear he will be ſuffocated. It is likewiſe dangerous, if (during the Difficulty of Breathing) the Pulſe is unequal or intermitting; and if the Cough leaves them, the Difficulty of Breathing continues; for 'tis a Sign the Cauſe of the Malady is very pernicious and obſtinate, and that Nature is ſo weak that it cannot overcome it.

For the curing the Diſorders occaſion'd by the Aſthma, *as Difficulty of Breathing*, &c. Bartholetus *has given us the beſt Rules in his Methods of curing a* Dyſpnæa; *and Sir* John Floyer *in his Treatiſe of the* Aſthma.

IN the Moiſt *Aſthma*, we ought to remove the Cauſe by endeavouring to evacuate the Matter by Vomit; for there is nothing cures the Moiſt Aſthmatick Paroxyſms ſo ſoon as Vomiting, which equally dicharges the Matter in the Stomach and in the Breaſt. The moſt proper Emeticks are Oxymel of Squills, *Rulandus's* Water, or the Emetick Wine of the Shops. Or Take, White Hellebore, half an Ounce; infuſe it in a Pint of White Wine. The Doſe is a Spoonful to vomit without Difficulty; or elſe half a Spoonful wonderfully looſens the Belly without Vomiting, if mix'd with other Laxatives; for which Reaſon it is of great Uſe in this Caſe. If ſome Drops of this Infuſion be added to any Lohoch, or the like, it plentifully facilitates Expectoration. As for Example:

Take, Raiſins pick'd, four Ounces; Liquorice, one Ounce; Honey Deſpumated, three Ounces; Sugar Candy, five Ounces; *Spaniſh* Wine, ſix; boil all into a Candy; then add ſome of the acid Spirit of Sulphur by the Bell to give it a pleaſant Taſte: Then take a few Drops of the Hellebore Wine aboveſaid in this. Purgatives in the Paroxyſm of the *Aſthma* irritate the Malady inſtead of relieving it; but they are uſeful when the Fit is over. The following Pills are excellent:

Take, two Scruples of Agarick Pills, half a Scruple of *Gum Ammoniacum*, two Grains of Troches of Alhandal, three of Extract of Cinnamon, or two Drops of the Oil; make into Pills. Or Take, of the Maſs of Pills of *Hiera*, with Agarick, *Gum Ammoniacum*, half a Scruple diſſolv'd in Vinegar of Squills; two Grains of Troches of Alhandal; make up with an Aſthmatick Spirit, that is proper withal to correct the Diſorder of the Stomach. Bleeding is not neceſſary, but when the *Aſthma* proceeds from the Stoppage of the Blood in the Breaſt; for when the Matter is obſtructed in the *Bronchia*, it is uſeleſs.

The Medicines that are proper in the Moiſt *Aſthma*, are ſuch as are called *Pectorals*, whoſe Action is to attenuate, reſolve and correct, the thick, viſcous and windy Subſtance that adhered to the Lungs, the Breaſt, or Stomach, which are as follow: Take, Cinnamon Water,

two

two Ounces; Oxymel of Squills, one; which is very good, especially in the Fit, according to *Riverius*'s Observation. Or take Saffron, half a Scruple; Musk, three Grains; in four Ounces of a Decoction of Orrice Root, for a Potion. Or a Dram of Ammoniacum, in four Ounces of Hyssop Water, and two of *Rhenish* Wine. Or take Fennil Roots, Florentine Orrice, of each three Ounces; Liquorice, two; boil in Spring Water, to the Consumption of a third Part, in eight Ounces of the Decoction; dissolve a Dram of Gum Ammoniacum, half an Ounce of Oxymel of Squills, an Ounce of Syrup of *Colewort*; mix all. *Brunerus* proposes this Potion as a *Panacæa* in the most obstinate Paroxisms, when all other Remedies have fail'd.

The Occult or *Convulsive Asthma* is cured by Anti-Epyleptick and Anti-Hysterick Medicines, as Volatile Salts of Amber, Hartshorn, Humane Blood, Castor, Cinabar of Antimony, Millipedes; to which we may add a little Laudanum, which has no Equal in convulsive Maladies, under which Denomination we may well bring in the *Hiccup*, as being a convulsive Irritation of the Oesophagus; or else proceeds from the too impetuous Motion of the Spirits towards the *Diaphragm*; in which Case take two Scruples of Treacle, half a Scruple of Aloes Wood, two Drops of Oil of Mace, a Grain of Laudanum; mix for a *Bolus* at Bed-time. Or apply the distill'd Oil of Aniseed to the Navel, or hot Bread steep'd in White Wine; or wash the Region of the Stomach with a Sponge dip'd in a Decoction of strong Vinegar, with Castor, Pepper and Mustard. When we find that the Disorder is in the Stomach, and Opiates will not do, we are to have Recourse to Evacuation, and especially to Vomits, for the most obstinate *Hiccups* sometimes proceed from a vitiated Pituite, sticking strongly to the Orifice of the Stomach; but if it is necessary to purge downwards, give the following Pills: Of Aloes, with Scammony, Mercurius Dulcis, and Laudanum, or else the Extract of Diacarthamum, one Scruple; Resin of Jalap, six Grains; Gum Ammoniacum, ten Grains; Balsam of Sulphur, *q.s.* make a Dose of Pills. To strengthen the Stomach after Purging or Vomiting, take Cinnamon Water and Mint Water, of each an Ounce; Confect of Alkermes, a Dram; Laudanum, two Grains; Syrup of Mint, one Ounce; make a Potion, which give by Spoonfuls. If the Hiccup proceed from the Crudities of the Stomach, *&c.* then give the Marocostive Pills, with Roses, *Elixir Proprietatis, &c.* If the Cause proceed from acrid, corrosive and fermenting Humours, then all the testaceous Powders, with the Earths, and such like, are the most proper; but if there be a Malignity, as in a Malignant Fever, then an Emulsion of the four Cold Seeds with Almond Milk, a little Sal Prunelle and Laudanum, is agreeable: Or the following Mixture; take an Ounce of the depurated Juice of Housleek, Rose and Plantane Water, of each two Ounces; the Yolk of an Egg, and an Ounce of Syrup of Purslane, with twelve Drops of liquid Laudanum: Mix and give by Spoonfuls.

The *Phtisis* or Phthisick is an Exulceration of the Lungs, attended with a slow or Hectick Fever, that wasts by little and little the whole Body. The Causes of these Ulcers are various, sometimes from too much Blood, its Acrimony, or that of the Lympha and other Gums that mix with the Blood in the Lungs. We might add to these, several others, as Wounds that penetrate the Breast, Contusions or Defluxions from above, spitting of Blood, Pleurisie, Peripneumony suppurated and ill cured, Small Pox, acid, corrosive and Mineral Vapours, sharp and vitriolick Waters, the Use of too acid or tartarous Wine. Or in short the Phthisick may be hereditary, and convey'd from one Generation to another. The Phthisick is a very contagious Disease, and the Leven of the Ulcer communicates its Malignity by the Breath, and the Spittle, which infects the Lungs of sound People, and disposes them to an Abscess and an Ulcer; for which Reason we find several married Persons who give and receive this Disease from one another.

Those who are afflicted with this Distemper become lean and meager in every Part, have a little dry Cough, spit Blood, and then Pus or Matter, respire with Pain, and have a gentle Fever, that is more upon them in the Night-time. Their nocturnal Sweats are plentiful, the Nose is sharp, the Cheeks drawn in, the Eyes hollow and sunk, the

Lips of a livid Colour; and towards the End, the Feet ſwell, they have a Looſeneſs, extream Thirſt, a Falling off of the Hair, they ſpit a fœtid ſtinking Matter, and in ſhort the Lungs conſume and ulcerate. If the *Phthiſis* come upon an Inflammation or Abſceſs of ſome *Viſcera*, or a Pleuriſy, or a Spitting of Blood, or the like, we have no Reaſon to lay any Fault upon the Stomach, but only conſider the principal Diſeaſe. We may know whether the Right or Left Side of the Lungs be affected, by the Side on which the Patient lies; for he can only reſt upon the diſaffected Side, being in Danger of being ſuffocated, if he changes to the other, according to the Obſervation of *Salmuthius*.

In the Cure of the *Phthiſick* we are to have Regard to two Things; the firſt is to remove the Cauſe that vitiates the Aliment, and infects the Maſs of Blood, that is to ſay, to ſtrengthen the Stomach, or temper the ſaline Acrimony of the Blood, or in ſhort cure the Ulcer of the affected *Viſcera:* The ſecond is to ſupply the Body with Plenty of Juices of the beſt Nouriſhment, to promote Digeſtion, ſo that the Chile may be enrich'd, and at the ſame Time the Blood temper'd and ſweeten'd. And by reaſon the Stomach is ſo conſiderably concern'd, Vomiting is very ſerviceable in the Beginning, with the kindly Acids, as ſweet Spirit of Salt, *Elixir Proprietatis*, the teſtaceous Powders, with Vinegar; and becauſe of the Acrimony of the Blood and the *Lympha*, Sulphurs, Amber, Myrrh, Antimony Diaphoretick, Poppies, Opium, Gum Tragacanth, Almonds, Raiſins, *&c.* are wholeſome. Or the following Decoction: Take Raſpines of *Guajacum*, four Ounces; *Salſaparilla*, two Ounces; of Squills, half an Ounce; Liverwort and Liquorice, of each ſix Drams; Raiſins, two Ounces; Aniſeed, two Drams; infuſe 'em all Night in two Gallons of Spring Water boiling hot: To the ſtrain'd Liquor add a due Quantity of Sugar, aromatiz'd with Cinnamon, to give a pleaſant Taſt. This is excellent in Catarrhs, and other Defluctions on the Lungs and Stomach.

A confirm'd *Phthiſick* or *Conſumption* is rarely cured, but it may be palliated, and Life preſerv'd a long Time, by the regular Uſe of Aſſes, Cows or Goats Milk, with the Aſſiſtance of Vulneraries, and Change of Air. Thoſe Medicines which are proper in this Diſtemper, and create a ſweet and laudable Chile, are eaſy of Digeſtion, and at the ſame Time temper the Acrimony of the Blood and other Juices of the Body, are Liquorice, Aniſeed, Lettuce, Betony, Coltsfoot, ſweet Almonds, Pine Nuts, Piſtachio's, the Greater Cold Seeds, and Emulſions from them, with Raiſins and the like, that by their Balſamick and oily Qualities temper the Acrimony of the Blood and Lympha; as do theſe: Take White Poppy Seed, Red Coral, and Burnt Ivory, of each a Dram; Bole Armenick, Flower of Brimſtone, of each a Dram; mix and take a Dram of this Powder Night and Morning in a Draught of Goats Milk. Or take Ground Ivy, White Horehound, Hyſſop, of each three Handfuls; Roots of *Enula Campana*, Florentine Orrice, of each two Ounces; *Calamus Aromaticus*, half an Ounce; Venice Turpentine, with Oil of Tartar, four Ounces; Hyſſop Water, two Quarts; *Malaga* Wine, one Quart; diſtil all in a Sand Heat, and ſeparate the Oil. The Doſe is two or three Spoonfuls twice a Day, in a Spoonful of Syrup of Ground Ivy, for Fluxes upon the *Breaſt*, *Coughs*, *Aſthma*, and *Phthiſick*.

If the *Phthiſick* ariſe from Defluxions, give *Crato*'s Pills of Amber, with Reſin of Jalap, and Balſam of *Peru*; and after them the Hounds-tongue and Storax Pill, of each ſix Grains: So *Starky*'s Pill is excellent. Or take the following, Storax in the Tear, two Drams; Extract of Liquorice, a Dram and half; Extract of Saffron, four Scruples; *Labdanum*, *Olibanum*, Myrrh, and Extract of *Opium*, of each a Dram; Syrup of *Citron Peel*, *qſ.* for a Maſs of Pills. Or take Juice of Ground Ivy clarified, a Pint; Hyſſop Tops, Sage, Betony, of each a Handful; Aniſeed, Carui, and Fennil, of each bruis'd half an Ounce; diſtil all in *Balneo Mariæ*, to the Conſumption of half; filter the Liquor, and diſtil the reſt again to the Conſiſtence of an Extract; to which add the Juice of Liquorice, half a Dram; Powder of *Enula Campana* Root, Flowers of Sulphur, of each three Drams; Flowers of Benjamin, a Dram; Balſam of *Peru*, half a Dram; Tincture of Sulphur, three Drams; *Laudanum*

num tartaris'd, two Drams; make a Maſs in Form of Pills, whereof three is a Doſe. For a Powder, take Sal Armoniack, Nitre purified of each half an Ounce; of Liquorice and Orrice, an Ounce each; make a Powder to take a Scruple every Morning in Syrup of Maidenhair. Beſides theſe, you have Recourſe to the ſeveral Preparations of Sulphur, as the Lac, Balſam, Spirit and Oil, with ſeveral Preparations of Steel, as the Salt, Vitriol, Tinctures of *Mars*, *&c.*

The *Cough*, which is a common Attendant both to the *Aſthma* and *Phthiſick*, is according to *Etmuller* a Kind of Expiration, in which one throws out the Air at the Mouth, and ſometimes with it the offending Matter contained in the *Trachea* and adjacent Parts, not all at once, but at ſeveral Times, and that with Violence to the whole Body. The Cough is made when the Muſcles which contract the *Thorax*, and drive out the Air, cannot perform it naturally and with Eaſe; but with Violence, and by a momentaneous Contraction. The Cough, as *Etmullerus* ſays, is voluntary and involuntary, depending on the Muſcles, and eſpecially the *Diaphragm*, which is in ſome Kind obſervant of the Will. This is a mix'd Action, partly natural, and partly animal; ſo that we can ſtop Expulſion as we we pleaſe, and provoke our ſelves to cough. Nevertheleſs Coughs are very obſtinate in Spite of us, and cannot be ſtop'd but by Medicine. Coughs are either dry, or moiſt; the Moiſt is when by endeavouring we throw out by the Mouth certain Humours of Blood, Pus, Lympha, or the like. The dry Cough is when after all our Efforts we can bring up nothing, and that the Body is tired in vain with Coughing, which occaſions Head-achs and Pains in the Sides, ſometimes inteſtinal *Hernia's* or Tumours of the *Scrotum*, and ſometimes involuntary Excretions of Urine, *&c.*

The Cauſe of Coughing is whatever mediately or immediately irritates the Muſcles or the Nerves which ſerve for Reſpiration; for the burning pricking of the Fibres of the Muſcles, and the Nerves that excite the Motion and rapid Courſe of the Spirits, makes it that the Muſcles muſt neceſſarily draw back, and conſequently the *Thorax*, and in Proportion as the Irritation is interrupted, the Motion of the Breaſt is interrupted, and cut ſhort. The Irritation of the Cough is either ſeated in the Windpipe or the Gullet, where it joins to the *Trachea* or the *Diaphragm*, or elſe in the Muſcles, or moving Fibres of thoſe Muſcles.

The Cure of the *Cough* conſiſts in removing the Cauſe, and ſtopping the Irritation or Motion to cough. The Cauſe is to be remov'd at firſt by Vomiting, eſpecially if the Fault is in the Stomach or Breaſt. We may then proceed with Laxatives, as the Infuſion of Agarick, with Powder of Carthanum, or *Mercurius Dulcis*, and Scammony ſulphurated, *&c.* To ſtop the Coughing, take a Scruple of *Sperma Ceti*, half a Scruple of Amber, three Grains of Laudanum; mix and divide this into two equal Parts, whereof take one about four a Clock in the Afternoon, and the other at Bed-time after a light Supper. Or take *Sperma Ceti*, two Scruples; Flowers of Benjamin, one Scruple; Volatile Salt of Amber, half a Scruple; four Grains of ſolid Laudanum; mix and divide into four equal Parts, to be taken at four Times, at the Hours of Reſt. So *Storax* Pills are profitable, with Syrup of *Diacodium*, a little Hyſſop-Water, and Oxymel of Squills: Or the following, take of Hyſſop and Coltsfoot Water, of each two Ounces; Syrup of Hyſſop and the green Tobacco, of each ſix Drams; Oxymel of Squills, half an Ounce, ſweet Spirit of Nitre, thirty Drops; mix for a Pectoral Potion, to promote Expectoration and plentiful Spitting. Beſides theſe, the Milk and Flower of Sulphur ſugar'd, Oil of Sugar made in the White of an Egg are good; and in a dry or convulſive Cough, the Spirits and volatile Salts of Urine, Hartſhorn, *&c.* are ſingular, being taken in due Quantities.

The *Hæmoptoſis* is properly when the Blood that flows from the Arteries of the Lungs, or the Arteries of the *Trachea*, is thrown out by the Mouth in Coughing. The Part affected is either the upper Part of the *Larynx* and its Cavity, or the Middle of the Pipe of the *Trachea*, or its annular Extremities, or in ſhort the Lungs themſelves. It is uſually attended with a Cough, when the Lungs are wounded, or the lower Branches of the *Trachea*. One may ſee ſometimes a ſtrong *Hæmoptoſis* without a Cough, to wit, when none but the upper Part of the *Tra-*

chea

chea is affected, and when the Blood flows more or leſs in Spitting.

The principal and moſt common Cauſes of the *Hæmoptoſis*, are firſt the breaking of ſome Veſſel in the Lungs cauſed by violent Cries, a Diſtenſion or an overloading the Body with ſome Weight, by a Fall, or exceſſive Coughing. Secondly, by an Eroſion of the Veſſels of the Lungs, or ſome external Things, received by Inſpiration, by *Aqua Fortis*, or ſome internal Cauſe, as the *Lympha* being too acid, ſalt and corroſive, ſometimes a ſtrong Cough, particularly during the Night. This is the Kind of *Hæmoptoſis* that leaves behind it a Conſumption, or Ulcer of the Lungs. Thirdly, the Suppreſſion of ſome uſual Evacuation, eſpecially from the lower Parts of the Body; for nothing is more common than to ſee a Suppreſſion of the Terms or Hæmorrhoids ſucceeded by a Spitting of Blood that falls upon the Lungs, and breaks ſome Veſſel there. The Differences that are obſerv'd in this Diſeaſe are theſe; Firſt, if the Blood caſt out be of a florid Colour or grumous; Secondly, if the Quantity be ſmall or great; Thirdly, if it proceed from the Body eaſily or with Pain, the *Hæmoptoſis* is freſh or of an old Standing; and Laſtly, whether it be periodical or fix'd.

As to the Prognoſticks, the Spitting of Blood which proceeds from a Defect of the Veins of the Lungs, is uſually follow'd by a Conſumption, and that with Death. That which comes from a Defect of the Veſſels of the Breaſt, is leſs dangerous than that from thoſe of the Lungs. In ſhort, the Spitting of Blood that is eſſential, is more dangerous than the ſymptomatick, ſuch as that of the *Pleureſy* or *Peripneumony*.

The Cure of this Diſeaſe conſiſts in removing the Cauſe that excites the Hemorrhage in the Breaſt, to ſtop the Flux of Blood, and the Spitting that depends thereon, in ſhort, to check the Fluidity of the Humours, and give a better Tone to the Parts. Bleeding at firſt is very neceſſary, when the Blood abounds, always obſerving the Rules of Revulſion. Diureticks are of uſe, but Purgatives hurtful, except ſuch as are barely ſolutive, as Caſſia, Cream of Tartar, or the like. *Henbane* Seed is called the *Padua* Secret for Spitting of Blood, but the Uſe of it ought not to be continued too long, leſt it hurt the Brain. The Moſs of Humane Skulls, *Crocus Martis aſtringens*, Tincture of the Sulphur of Vitriol, *Lapis Hæmatitis*, the Moſs of Sloe-Trees, *&c.* are of ſingular Uſe; in the Paroxiſm apply as follows.

Take Waters of Shepherds-Purſe and Horſe-tail, of each an Ounce; Syrup of Comfry, two Ounces; *Croc. Martis aſtring.* a Dram; the White Henbane Seed, two Scruples; mix for a Potion. Or take Plantane and the two former Waters, of each an Ounce; Syrup of Purſlane and Comfry, the ſame Quantity. Tincture of the Sulphur of Vitriol, a Dram; mix. The Doſe is two or three Spoonfuls. Or take White Poppy-ſeed, two Drams; Purſlane-ſeed, one Dram; White Henbane-ſeed, half a Scruple; *Lapis Hæmatitis* prepared, one Dram; *Crocus Martis aſtr.* two Scruples, with Syrup of Comfry and Purſlane, *qſ.* make a Lohoch. Or take Conſerve of Comfry and Tormentil, of each an Ounce, *Hæmatites* Stone prepar'd, a Dram and half; *Crocus Mart. aſtr.* a Dram; White Henbane-ſeed, two Scruples, with Syrup of Mint. Make an Electuary, whereof take a Dram four Times a Day. Or take Conſerve of Wild Roſes, and Flowers of Comfry, of each an Ounce; White Poppy and Henbane-ſeeds, of each three Drams; Troches of Alkekengi and Diatragacanths, of each two Drams; *Hæmatites* Stone, Dragons Blood, and Bole, of each a Dram; Syrup of Poppy, *qſ.* to make an Electuary, whereof take two Drams twice a Day, drinking after it an Ounce or two of Plantane Water, ſix Drams of Syrup of Red Roſes, and twenty Drops of Spirit of Vitriol. For Externals, I refer you to the Stiptick Water, *&c.* in the firſt Volume.

An Anatomical Hiſtory of the Brain ; *communicated by Mr.* Francis Poupart *to Mr.* Le Clerc, *Phyſician in Ordinary to the* French *King.*

A Deſcription of the Brain.

WHoever would know the true Reaſons of the Motion of a Watch, can never ſatisfy himſelf better than by taking it in Pieces, after he has invented its Outſide. In the ſame Manner the Naturaliſt, who enquires into the Cauſes of the Functions of the Brain, muſt diſſect the wonderful Machine, and conſider well all the Parts which compoſe it.

After the Five common Teguments are remov'd, there remain Three more particular to the Head alone; the one Carnous, the other Fleſhy, and the laſt Bony, *viz.* the Muſcles, the *Pericranium*, and the Skull, which ſerves as a natural Helmet to cover the Brain, and defend it from the Injuries which ſo ſoft a Subſtance would otherwiſe be expos'd to. I ſhall not ſpend Time in obſerving, that the Skull is divided into Two Tables, which are ſeparated by a ſpungy or cavernous Space, call'd the *Diploe*; that this natural Armour is made of Pieces well adjuſted together, and diſtinguiſh'd by Junctures call'd *Sutures*, which are ſo many Vents through which the Vapours of the Brain exhale; that the inner Surface of the Skin is lin'd with the *Dura Mater*, and has ſeveral Furrows imprinted in it by the Beating of the Arteries of the *Dura Mater*, whilſt the Subſtance of that Bone was tender: Nor in ſhort, that the round Figure was given to it in Men, whoſe Brain is larger than that of other Animals, that it might be more capacious and ſolid. For the Famous Mr. *Boyle* having put two Glaſs Veſſels into his Pneumatick Engine, and exhauſted the Air, ſuffering it to ruſh in of a ſudden by opening a Paſſage, he found the round Glaſs entire, when that of an irregular Figure was broke by the *Impetus* of the Air. I ſhall paſs over theſe Conſiderations, ſince they do not aſſiſt us much in the Knowledge of the Animal Operations, which is the Scope of the preſent Deſign.

When the Cap is taken off the Brain, it preſents it ſelf to View, as it is cover'd with the *Dura* and *Pia Mater*, which are interlac'd with an Infinity of Veins and Arteries, from the Beating of which its *Syſtole* and *Diaſtole* proceed. The *Dura Mater*, beſides a vaſt Number of ſmall Veſſels, has four conſiderable Branches, call'd *Sinus's*, which have a Pulſation like Arteries, and bring back the refluent Blood into the Veins. Some have thought the Animal Spirits are generated there; and others allot them to cool the Blood which comes out of the Arteries: But their true Uſe is like a *Balneum Mariæ*, by a mild and moiſt Heat to help the Diſtillation of the Animal Spirits in the Subſtance of the Brain, and bring back the ſuperfluous Blood into the Jugular Veins. All the Veins of this Part are like ſo many ſmall Brooks, which diſcharge Blood into four great Rivers.

The *Sinus* extending along the *Falx*, anſwering to the Sagittal Suture, is the largeſt of all; and the *Lambdoidal* Suture is larger than the fourth, which is call'd *Torcular*. This is form'd by the Concourſe of the three former, and ſtrikes into the inmoſt Parts of the Brain. When it arrives at the *Glandula Pinealis*, which adheres cloſe to it by a certain Number of Veſſels, it makes a Fork, one Branch going to the Right, and the other to the Left Ventricle, and there forms the *Plexus Choroides*, by joining to two Arteries which riſe from the *Carotids*, and proceed along the Sides of the *Medulla Oblongata*, and theſe *Plexus* follow the *Medulla Oblongata* if it be drawn back. They are likewiſe compos'd of a Quantity of Lymphatick Veſſels, and many imperceptible Glands, which gives Occaſion to believe, that Part of

of the Seroſities found in the Ventricles of the Brain may be ſeparated there. However, it is probable this is not the chief Uſe of theſe *Plexus's*, but rather that they ſerve as a *Balneum Mariæ*, whoſe Heat keeps Motion in the Animal Spirits lodg'd in the *Corpus Calloſum* immediately above them, which otherwiſe would be cold, having few or no Spirits to heat them. The Heat of theſe *Plexus's* further ſerves to keep the Seroſities in the Ventricles fluid, which otherwiſe would be diſpos'd to thicken by the Cold, and by this Means prevents *Apoplexies* and *Palſies*, which the Stagnation of theſe condens'd Liquors, or the Obſtruction of the *Infundibulum* would otherwiſe cauſe.

As Rivers divide Countries, ſo theſe *Sinus's*, as ſo many Currents of Water, ſeparate the Brain into three Provinces. The Lateral ones make a Separation of the Brain and *Cerebellum*. The former is divided into two Hemiſpheres by the longitudinal one, which breaks the Impetuoſity by ſeveral Ligaments, which may aptly be compared to Chains drawn acroſs Streets to ſtop the Confluence of People. Beſides this, theſe Ligaments ſerve to keep the *Sinus* at a certain Diſtance, for fear the Channel ſhould be too much enlarg'd by extraordinary Inundations. Theſe ſerve too as Bridles to give a Check to, or haſten, the Circulation of the Blood, by their Contraction and Relaxation; for the refluent Blood having loſt its moſt ſpirituous Part in the Cinereous Part of the Brain, and having left behind it in the Glands of the Membranes a Part of its Seroſity, muſt neceſſarily be thicker: Therefore to prevent it from ſtagnating in the *Sinus*, there are Arteries inſerted into it, which add new Life and Motion to it.

The Veins which come to theſe *Sinus's*, have their Courſe from before backwards in Animals with their Heads hanging down, leſt a contrary Poſition might give Way for the Blood to fall down to the Noſtrils, where it would be inclos'd by its Weight; but in Men theſe Veins tend from behind forwards, from whence it proceeds that Men are more ſubject to bleed at the Noſe than Beaſts. And ſince theſe Lateral *Sinus's* may be more preſs'd by the *Cerebellum* in Beaſts, who have their Head hanging down, and eſpecially ſuch as are deſign'd for Swiftneſs, as Dogs, or Fighting, as Lions, which might ſtop the Circulation of the Blood in the Brain; Nature has plac'd a Bone of a triangular Figure between the *Cerebellum* and theſe *Sinus's* to prevent Compreſſion. Without this, the Weight of the *Cerebellum* would preſs together its Channels, and hinder the free Motion of the Animal Spirits, and cauſe a perpetual Lethargy.

It is on theſe *Sinus's* chiefly that the convex Surface of the Brain is tied to the Skull, which helps to ſuſpend the Brain, and its concave Surface adheres to the firſt by ſeveral Veſſels. This is interwoven with a great Number of Arteries, the leaſt of which have but one Tunick, and as many Veins, which form divers admirable *Labyrinths*. It does all the good Offices to the Brain which a tender Mother can do to her Infant. It keeps it warm in her Boſom, when it has not Strength to ſtand of it ſelf: It defends and keeps it from external Injuries, and gives its Breaſt to draw Nouriſhment from. The *Dura Mater* does the ſame Services for the Brain, and after that there is no Room to ask whence it has its Name; though ſome pretend theſe Membranes are ſo call'd, becauſe the reſt in all Parts of the Body ſpring from them.

Though the *Pia Mater* be a very thin Membrane, yet it is beſet with a great Number of Glands, which can only be ſeen by the Microſcope; or after they have been ſoak'd for ſome Time in warm Water, they will ſwell, as in a *Hydrocephalus*; for then being full of Seroſities, they are conſiderable. They were firſt diſcover'd by Dr. *Willis* in an Hydropical Head; but it cannot be ſaid they are the Products of a Diſeaſe, becauſe they are found naturally in the Head of all Animals. All theſe Glands being very ſmall, do not hinder the *Pia Mater*, which abounds with them, from inſinuating it ſelf into the deepeſt *Anfractus* in the *Cinereous* Part of the Brain, ſtopping on the Edge of the callous Subſtance, on which it beſtows ſeveral Veſſels, though Doctor *Willis* has not obſerved any.

The Brain being entirely diveſted of theſe two Membranes, its *Cinereous* Aſh-coloured Subſtance appears under. This Colour is not ſuperficial, but penetrates to the Bottom of the Sinuoſities, under which lies the Medullary

dullary Part, which is as white as Snow. It is very probable that the different Colour of these two Parts does only proceed from the different Dispositions of their Surfaces; and that the one is white, because it reflects more Light, and the other brown, because it reflects less Light, towards ones Eyes, Part of which it drinks into its Pores.

But a more particular Cause of the brown Colour may be given, by ascribing it to the *Sal Armoniack*, which is very plentiful in the Brain, that by its Volatility is sublim'd to the upper Part, being stop'd there by the close Contexture of the Skull. The Scent of the Brain, especially when it begins to corrupt, and the Chymical Anatomy of it by Distillation, shew it is fill'd with such a Salt as we have describ'd. Lastly, the greyish Colour of the inner Substance of the Kidneys, which is full of an Urinous Salt, shews, that this is capable of giving a Colour to such Bodies as it abounds in, as in the *Cinereous* Part of the Brain.

This Part is distinguish'd by a Multitude of Furrows, the Use of which was unknown to the Ancients. *Aristotle* fancies they serv'd to make the Brain lighter; but if this were all the Design, Nature might have made it lesser. *Erasistratus* places the Understanding here, which is founded on the Variety of its *Anfractus*, which answers well enough to the Variety of its Thoughts: But this Imagination being founded more on Morality than Nature, I shall pass it by in this Place. But it is more probable they serve to introduce the Vessels into the *Pia Mater*, which goes to the Bottom of these Furrows.

And since they are so many Pores through which the Matter of the Spirits is convey'd into the Brain, those Animals which have most of these *Anfractus's*, must have most Spirits, and by Consequence most Sagacity, which chiefly depends on this subtle Liquor. To this Dr. *Willis*'s Observations do very well agree; and as the Animal Functions in Men do require more Spirits than in Beasts, we may conclude with much more Reason, that those who have the fewest *Anfractus's*, have the least Wit, because they cannot so well exercise the chief Functions of the Soul, as those who have more. Wherefore little Heads, which have very few, and sharp-pointed Heads, which contain still less, because the *Cinereous* Part is very small, being press'd by this Figure, which contracts it self above, are subject to Folly, which gives Way to the *Latin* Proverb, *Cilones in Insaniam proclives sunt*; and the Prince of the *Greek* Poets observes, that *Thersites* had his Soul as ill turn'd as his Body.

We have insisted long on the Surface of the Brain, if we proceed a little further, and examine nearer the *Cinereous* Substance, we shall find that it is nothing more than an Aggregate of an Infinity of small Glands, which are more conspicuous when the Brain is thoroughly boil'd, than when it is raw and not boil'd at all. And as all the Glands which serve for Filtration have a particular Vessel into which they discharge their Liquor, so the Glands of the Brain have each their particular excretory Tube, thro' which the Animal Spirit which they filter is convey'd.

All these Tubes meeting in a *Fasciculus* or Bundle, make the *Corpus Callosum*, which lies immediately under the Ash-coloured Substance. They form also the Spinal Marrow and *Medulla Oblongata*, which is seated under the *Corpus Callosum*, so that the Brain may be justly compared to a Bunch of Grapes. The Glands of the Cinereous Substance are the Grapes, the Medullary Tubes which arise from them are the Stalks, which unite, and end in one Stalk, and that is the *Medulla Oblongata*. The Tubes arising from these Glands are thicker in the *Corpus Callosum*, which is immediately beneath them, than in the *Medulla Oblongata*, which is more distant. Nor can it be thought strange that this last is not so large as the *Corpus Callosum*, though it be an Aggregate of the same Tubes which compose both.

If we pursue these *Medullary* Channels, they will lead us to certain Cavities, call'd the *Ventricles* of the Brain, which seem to be form'd by the Meeting of the two great Branches, which rising from the Trunk of the *Medulla Oblongata*, or the Basis of the Brain, form a Sort of *Arbor*, their Figure resembling a Crescent, which perhaps gave the Ancients Occasion to fancy the Moon had the Government of the Brain. The Serosities with which most commonly they are fill'd, the Situation of the *Infundibulum* in the Midst of them, in which it serves as a Sink, and the

Glandula Pituitaria directly beneath to receive what comes from them, ſeem to evince they are only Receptacles of the ſuperfluous Moiſture of the Brain, and not the Laboratory of the Animal Spirits, which ſubtle Fluid muſt needs eſcape thro' the Arches of theſe Vaults, or the *Infundibulum*, or the Hole which anſwers to the *Criſta Galli*.

Theſe two Ventricles are divided by a Partition, which the *Latins* call *Septum Lucidum*, by reaſon of its Tranſparency. This Partition is faſten'd above in the Roof of the Ventricles, and below to the *Medulla Oblongata*, between two Eminencies, call'd *Corpora Striata* or the Channelled Bodies, from the Furrows viſible in them.

And as all Roofs have need of ſome Pillars or other Props to ſupport them, ſo this of the Brain has Three; one of which is called the *Baſis* of the Vault, which is ſeated between the *Thalami* or Beds of the Optick Nerves, and their *Striatæ* or Channelled Bodies. The two others are call'd the Arms of the Vault, becauſe in Effect they embrace the Thighs of the *Medulla Oblongata*. Theſe might with better Reaſon be call'd the Arches of the Vault, becauſe theſe Arms bending a little towards the Sides of the *Medulla Oblongata*, form a Ridge with two Arches, and three Pillars, which make the *Baſis* of the Roof, and the two Extremities of its Arms, which ſupport themſelves on the *Medulla Oblongata*. The two Branches of this *Medulla* bear the Name of the Thighs, not only becauſe they pretty much reſemble thoſe Parts in their Figure, but further becauſe there are above them two Eminencies which are like Buttocks. Between theſe two Parts there is a Hole, which is call'd the *Vulva*, becauſe its Figure and Situation is not much unlike that Part. That call'd *Anus*, has its Name too for its Likeneſs, which is preciſely between the Buttocks, at the Entry into the third Ventricle.

The Thighs of the *Medulla Oblongata* do not cloſe ſo well, but that they leave behind them a Hole call'd *Infundibulum* or the Funnel, which terminates at the *Sella Turcica* on the *Glandula Pituitaria*, with which it is enchaſed there as in a Nich, and all interlac'd with an Infinity of ſmall Arteries which come from the *Carotids*; for it is by that Way they enter into the Brain, their Branches joining with ſo many ſmall Veins, compoſe that Contexture which is call'd *Rete Mirabile*. The Pituitary Gland is like a Spunge, which abſorbs the ſuperfluous Serofity that is contain'd in the Arteries of that *Plexus*, which Man has no Occaſion for, his Blood not being ſo watry as that of Beaſts.

The Veins of the *Rete Mirabile*, which terminate likewiſe in the Pituitary Gland, are charg'd with the Humidities which the *Infundibulum* is conſtantly pouring in, and which it receives from the Arteries which enter it on every Side, and carries them into the Jugular Veins to make the Blood more fluid, which, by the Loſs of its Spirits in paſſing through the Brain, was become thick; and this is the Cauſe too why the Trunk of the Lymphatick Veſſels diſcharges its *Lympha* into the Axillary Veins, which are Ramifications of the Jugulars. The Injection of coloured Liquors, which is made through the *Infundibulum*, and which appear in the Jugulars, will not ſuffer us to doubt that the Serofities of the Brain go thither: For we muſt not believe that the Water which runs thro' the *Infundibulum*, paſſes thro' the *Os Sphænoides*, and diſcharges it ſelf by the Palate into the Mouth; tho' the Water which Dr. *Willis* poured into the *Sella Turcica*, after he had remov'd the *Dura Mater*, which lin'd it, the Pituitary Gland, and all the Veſſels of the *Rete Mirabile*, ſome of which fill the Holes of the *Os Sphænoides*, did diſtil into the Mouth, becauſe he himſelf had made a Paſſage by removing the Veſſels which fill the Holes; whereas in a Living Animal this Bone being lin'd with the *Dura Mater*, and its Holes fill'd, it is impoſſible that any Liquor ſhould paſs, as any one will find who ſhall pleaſe to make the Experiment: Pour Water, or any other ſubtle Liquor, as Spirit of Wine, into the *Sella Turcica*, and you will not find the leaſt Drop go into the Mouth. For the better diſcovering the Pituitary Gland, and the *Rete Mirabile*, you muſt free the *Dura Mater*, which adheres to the *Baſis* of the Skull, beginning at the Entry of the Spinal Marrow, and continuing to the *Sella Turcica*. This cannot eaſily be done but in the Head of a Calf, becauſe that in other Animals, who have the Head leſs tender and moiſt, this Membrane clings more cloſely.

The

The Pituitary Gland is not only water'd by the Serosities of the interior Ventricles, but those which come from the *Cerebel* by the fourth Ventricle, or that which flows from the *Nates* by the third. And this can scarcely be denied, if we reflect, that from the fourth Ventricle quite to the *Infundibulum* there is a continued Valley, in which there was a Stream of Serosities, which passing under this Part, call'd *Varolius*'s Bridge, seated under the *Glandula Pinealis*, goes and discharges it self into the *Infundibulum*, and thence into the Pituitary Gland.

But for fear this Rivulet should exceed its Bounds, and run over the Lateral Processes, which bound its Channel to the Right and Left, and which are seated between the Brain and the *Cerebel*, there is a Cloth spread over to hinder these Inundations. For the rest this Cloth cannot in any Manner do the Office of a Valve, because it hinders neither Wind, nor any other Liquor, from passing from the third to the fourth Ventricle, nor from the fourth to the third, as appears by making of Injections. Besides that, its two Ends are fasten'd to the Roof of these Ventricles, that is, to the Cerebel at the Head of the Vermicular Process, and on the Sides of the *Nates*, to the Edge of the Testicles; whereas to perform the Office of a Valve, it ought to have been fasten'd below.

For the more fully evincing the Truth of this, there requires nothing more but to pass the Probe dextrously underneath, and to observe heedfully, upon laying it open, whether it has made it self a Passage by leaving the soft Substance, or has follow'd the Road which Nature has trac'd; and if you have introduc'd it as you ought, you will find it has made no Breach. From what I have said, I am perswaded that the third and fourth Ventricle, as well as the two anterior ones, only serve to receive the Serosities of the Parts above them; very far from what *Bartholin* fancies, that they are the Places where the Animal Spirits are generated. The third Ventricle arises from the Conjunction of the two anterior ones by their concave Surfaces. Both those half Spheres, and their Processes, which have the Shape and Name of Testicles, are only Productions of the *Medulla Oblongata*.

In passing from the Eminencies to the *Cerebellum*, there are three Sorts of *Apophyses* or *Processes*, *viz.* two Lateral, lying all along the Marrow on its Edges. These are join'd by a middle Process, where the Pathetick Nerves take their Rise All these Processes are on the *Medulla Oblongata*, below which there are the Pyramidal and Annular Processes, which taking their Rise from the *Cerebel* like a Ring, embrace the *Medulla Oblongata*. These Lateral Processes serve to keep a Communication between the Brain and Cerebel, and convey the Undulation of the Spirits from one to the other; and perhaps the Course of one is from the Brain to the Cerebel, and the other is the Reverse of this, that two contrary Undulations at the same Time may not hinder one another; and this is the Reason of their Duplicity.

The middle Process communicates to the Pathetick Nerves which arise from it, the Undulations which the Passions imprint on the Spirits, and which pass from the *Cerebel* to the Brain by the Lateral Processes. These Undulations of the Spirits being convey'd to the Muscles of the Eye, put them into several Motions proper to discover the Passions which cause them, as any one may discover in himself or another upon any Emotion of the Eye, and from this they derive their Name. The Pyramidal Processes are the Receptacle of the Spirits, which flow into the eighth Pair of Nerves, which assisting in the incessant Motions of the Lungs and Diaphragm, require a great Stock of Spirits, which are kept in these Processes.

In the last Place, the Annular Processes serve to keep a Communication between the Heart and the Brain, in such Manner that all the Pathetick Undulations which are rais'd in the Spirits of the Heart being convey'd to the Brain, chiefly by the Nerves of the fifth and sixth Pair, pass through the Process in which these two Pair of Nerves terminate. For this Reason it is, that Animals which are most passionate have these Processes larger than others, because the Spirits dilate them by passing often through them.

The *Cerebel* in which these Processes terminate, is form'd by two Branches, which leaving the Sides of the Trunk of the *Medulla Oblongata*, form a Sort of *Arbor* above, meeting in the Middle, and leave a Cavity,

between which is accounted the fourth *Ventricle*, which towards the Spine ends in a Point like that of a Pen. Theſe Branches, as they recede from the Trunk, are divided into ſeveral leſſer ones, which make a Sort of a little Wood in the Subſtance of the *Cerebel*, whoſe Sides are eaſily divided into ſeveral Pieces.

This Separation is made by the Help of a few large *Anfractus*. The ſmall ones are more numerous and regular than thoſe of the Brain, and form a Cortical Subſtance like ſo many Bowels, of which the *Corpus Calloſum* reſembles the Meſentery. The deepeſt *Anfractus* are in the middle Proceſs, which from its Figure is call'd the *Vermicular one*. It reſembles a Ring, which encompaſſes the *Cerebel*, or a Worm which bends back to bite its Tail.

It may be obſerv'd, that the *Cerebel* in Men and Beaſts are very much alike, becauſe the Vital and Natural Actions which depend on it are perform'd in the ſame Manner in one as in the other; whereas there is a very conſiderable Difference between the Brains in Men and other Animals, becauſe the ſenſitive Functions of this Part are very different. I think, the Opinion of thoſe Men is too Metaphyſical, who pretend that the Furrows of the *Cerebel* ought to be regular, becauſe its Functions are all orderly; and that thoſe of the Brain ſhould be irregular, by reaſon of the various Modes it exerts in its Operations.

The *Cerebel* and Brain are both plac'd and ſupported on the *Medulla Oblongata*, or rather they are only principal Branches of this great Trunk, while the Nerves are leſſer ones. The *Olfactory* Nerves ariſe from its anterior Extremity, or its two firſt Eminencies, which are call'd the *Striatæ* or Channelled Bodies.

The *Optick Nerves* come from theſe two Eminencies which are in the anterior Bodies, between the *Striatæ* and the *Nates*; and for this Reaſon they are call'd the Optick Beds or *Thalami Optici*. The Motary Nerves of the Eye ariſe from that Place of the *Medulla Oblongata* which lies between the two Eminencies and the *Nates* or Buttocks. The Patheticks ſpring from the middle Proceſs, which joins the two Lateral ones, and is ſeated behind the Teſticles. The fifth or ſixth Pair ſpring from the Annular Proceſſes; the ſeventh and eighth Pair from the *Medulla Oblongata* under the *Cerebel*; the ninth, tenth and eleventh, take their Riſe from the Extremity of the *Medulla Oblongata* beyond the *Cerebel*.

Laſtly, all the other Nerves, which are very numerous, ariſe from the ſame Marrow when included in the Bones of the Spine of the Back, and (like Organs) are compos'd of a large Pipe, and ſeveral ſmall ones. The great Tube is the Spinal Marrow, and the ſmall ones are the Nerves which come from it. The Animal Spirits which flow through it are like the Air which fill theſe Organs, and the Soul is like the Organiſt which plays them, determining the Spirits ſometimes into one Nerve, and at other times into another; though often it has no Share, the exterior Objects becoming then the Organiſt, and determining the Spirits in different Manners. Though all Nerves ariſe from the Brain, yet it may be ſaid it has none, becauſe none are inſerted into it; and therefore its proper Subſtance has no Senſe, tho' it gives Senſe to the whole Body, which ſhews the Falſity of that Axiom of the Schools, *That nothing can give what it has not.*

Of the Method of diſſecting the Brain. *From the ſame Author.*

FOR the perfect View of all the Parts mention'd, I do not approve of making too deep Inciſions into the Brain, reaching to its Ventricles, which is *Sylvius*'s Way; or making them beneath on the Sides of the *Medulla Oblongata*, as *Bartholin* teaches; nor of cutting the Brain Horizontally, as the moſt Part of our Surgeons ſtill do. Laſtly, though Dr. *Willis*'s Method be excellent, I would not, like him, cut the two *Lateral Parietes* of the *anterior Ventricles* with the *Baſis* of the Arch and the *Septum Lucidum*, which cannot be demonſtrated if we purſue theſe Steps; nor would I at firſt cut the Brain thro'

thro' the Middle, for a Reaſon I ſhall hereafter give.

I am perſwaded, that the more a Part can be unravelled without cutting its Subſtance, the better its natural Structure may be diſcover'd, which otherwiſe is much alter'd by the Inciſions made into it: Therefore I admit, that when all the Parts are exactly laid bare as far as they can be without tearing their Subſtance, to ſee as it were the Outſide of Nature, there may be as many Inciſions made as you pleaſe to view the Inſide; one ſerves to diſcover the Form of the Part, and the other its Fabrick. If any one deſires to know the Artifice of a Machine, he cannot take a better Way than to run through the Jointings and Separations which the Workman has left between its Parts; ſo the Anatomiſt who would diſcover the natural Machine of an Animal Body, cannot do better than to follow the Separation or Diviſion which Nature has made; and this is the Way that I have taken to demonſtrate the Structure of the Brain.

After the Skull is neatly ſaw'd off all round, without cutting the *Meninges*, and the Brain by this Means is laid bare, I make an Inciſion with the Point of a Knife, and enter into the *Sinus* at their meeting, that is, at the lower End of the *Falx*, becauſe they are largeſt there: Then introducing a Probe into each *Sinus*, I open the three upper ones, by cutting lengthways the Membrane which joins them; I follow the Longitudinal to the *Criſta Galli*, and the Lateral ones to the Jugular Veins, into which they diſcharge the Blood they carry.

By this we ſee the *Jugular Veins* are conſiderably dilated where they go out of the Head, and make each of them a Sort of a Gulph, where the Blood ſtops in the precipitate Courſe of its Deſcent, for fear it ſhould fall with too great Rapidity, and the Brain be too ſoon evacuated, and the Heart oppreſs'd with too great Abundance. After this, I ſlit the *Dura Mater* from the Proceſs of the *Ethmoidal Bone*, which is call'd *Criſta Galli*, quite to the Beginning of the Spinal Marrow to the Right and the Left; and I cut the Lateral *Falces*, which lie in that Valley which ſeparates the Brain from the *Cerebel*, in order to turn the Brain back. For this Purpoſe having cut the *Dura Mater*, which makes a Bridle before, and hinders the turning it back, I divide in the neateſt Manner I can the Mamillary Proceſſes of the *Olfactory Nerves* which lie beneath. This Separation may be handſomely made with the End of the Handle of a Dreſſing-knife, cutting finely with the Point the ſmall Ligaments which tie theſe Bodies together.

After this, I make an Inciſion on the *Olfactory Nerves* to lay open a conſiderable Cavity, which moſt commonly is fill'd with Seroſities in Beaſts which graze; becauſe their Nouriſhment being moiſter than that of other Animals, their Brain is ſo in Proportion likewiſe. This Water ſerves to abate the exceſſive ſtrong Scent of ſome Plants, which would offend the tender Subſtance of the Brain, as the Humours of the Eyes preſerve the *Retina* from the violent Striking of the Rays of the Sun. Although the Cavity of the *Olfactory Nerves* be not very ſenſible in Men, yet the yellow Water which Dr. *Willis* has ſeen flowing from the Noſtrils of an Epileptick Woman, who had the Ventricles of the Brain full, makes us conjecture that there are one or more inſenſible Ways which bring to the Noſtrils Part of the Moiſture of the Brain, which contribute to furniſh Matter for the Snot.

This done, I finiſh with cutting the *Olfactory Nerves*, which I continue to ſeparate gently from the *Baſis* of the Brain quite to their Riſe. Then the Brain begins to invert it ſelf by its own Weight, if it have Room to incline backwards, and diſcovers the Optick Nerves, which muſt be diveſted of the two Membranes, to ſhew how they are united in the Place where they enter the Cavity of the Skull, how they are ſeparated again above, and the Difference of the Fibres which compoſe theſe two Nerves. In ſhort, I follow them to the *Optick Eminence*, that is, to their Organ.

I do the ſame Thing to all the other Nerves, and cutting all thoſe Strings which tie the Brain to the Skull, I take it quite out of its Place. This Method of taking the Brain out of the Skull is good; but I ſhall ſhew another, which is ſomething more tedious, but is much better. Having laid open the Artery of the Neck of an Animal, and made an Inciſion ſufficient to receive the End of a Syringe, I make ſeveral Injections with

with a certain black Liquor, or rather with Wax melted and mix'd with Oil and Turpentine, according to the Method of *Swammerdam*. This dextrous Anatomiſt has ſince found the Way to do this with *Quickſilver*, which does it much better than Wax, becauſe the Veſſels are not ſo ſoon broken with it as the former. I continue theſe Injections, till I find that the *Jugular Veins*, which I have alſo laid bare, are fill'd with it; then I tie the Veins to ſtop the Liquor in the Brain, and view more commodiouſly the agreeable Ramification of the *Carotids* and *Vertebral Arteries*, and the *Jugular Veins*, and the Communication of theſe three Sorts of Veſſels with one another.

To diſcover the Diſtribution of this Liquor in the Veſſels of the Brain, I ſaw the Skull handſomely round, and having ſeparated the *Dura Mater* which lines it, I take the Cap which covers the Brain; after which, by the colour'd Injection I trace the wonderful Diſtribution of the Veſſels, and by the Help of this find the Veins which empty themſelves into the *Longitudinal Sinus*, and are inſerted from before backwards in Beaſts, and from behind forwards in Men. Or to diſtinguiſh more eaſily, and with one tranſient Glance of the Eye, the Arteries from the Veins, I begin with Injections into the Jugular Vein, having firſt evacuated the Blood by pricking it with a Lancet, and tied the *Carotids*; and then I drive the Liquor forcibly with a Syringe to beat down the *Valves* which might hinder the Diſtribution.

I tie the *Carotids* in the firſt Place, becauſe it would be in vain to let out the Blood in the Jugular, if I did not hinder new Blood from being pour'd in continually by the Arteries. I evacuate the Vein, that the Injection may find a more eaſy Paſſage, and give a better Tincture. In the laſt Place, I begin theſe Injections rather through the Vein than the Artery, becauſe if the Liquor ſhould be ſuppos'd to paſs from the Artery into the Vein, they would be fill'd with the ſame Liquor if I began the Injection through the Artery; whereas on the contrary, if I firſt inject the Vein, not a Drop will paſs into the Artery; and when the injected Wax is cold, if I then inject the Artery, it is plain nothing can paſs out of it into the Vein, ſince that was fill'd with the former Injections; and eſpecially if this be done with Wax, which hardens immediately. The Syringe invented by *M. Swammerdam*, for the common ones will not ſerve, muſt be well heated, and the Injection made near a good Fire, while the Animal is yet alive, that the natural Heat of the Part may ſupply the Place of an artificial one, which is procur'd by keeping the Part in warm Water; but there is no Room to foment the Brain in this Manner: Therefore it would be better to take it out, if it could be done without breaking the Veſſels of the *Dura Mater*, which adheres cloſe to it; for then they might be heated with warm Water, which would hinder the Wax from congealing ſo ſoon.

Thus the Arteries and Veins are eaſily diſtinguiſh'd by their different Colours, and you will ſee where the Veins are inſerted into the *Sinus*. You will ſee at the ſame Time, that one *Carotid* has a Communication with the other, and both of them with the *Vertebral Arteries*, ſince the Injection made into one *Carotid* will not only be imparted to the other, but likewiſe to the *Vertebral Arteries*.

According to this Method, you muſt have a Care not to cut the *Dura Mater* till the Brain be taken out, and all its Veſſels examin'd, which are diſpers'd through its Membranes, becauſe this cannot be done without cutting ſome one of theſe Veſſels, which loſing all their Liquor, would fruſtrate ſuch an Injection: But the *Dura Mater* muſt be carefully ſeparated from the other Bones, as it was in that Part of the Skull which was taken off. When in making this Separation you come to the *Sella Turcica*, you muſt tie them to prevent the Effuſion of the Liquor in them, and keep the other Arteries from emptying themſelves. The ſame muſt be done to the Jugular Veins and the *Vertebral Arteries*, continuing till the *Dura Mater* be ſeparated from the Bone, and the Nerves be cut, that you may take out the Brain.

Then you may ſee all the Veins and Arteries which water the upper and lower Part of the Brain, and run curiouſly through it. I then ſlit the *Dura Mater* under the *Medulla Oblongata* quite from the *Olfactory Nerves* to the Beginning of the Spinal Marrow, and ſeparate it gently from the *Pia Mater*, to which it is tied by a Number of ſmall

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Veſſels, bringing it to the Sides of the Brain, and upwards towards the *Falx*, which muſt be carefully ſeparated from the Brain without tearing any Thing. For this Purpoſe you muſt gently dilate the great Fold in which it lies, drawing it one Way and another, and cutting at the ſame Time all the ſmall Filaments which tie the *Falx*, or join both Sides of the Folds together. You muſt continue to do this till you come to the Arch of the Brain, and then it will be eaſy to turn back the *Falx*, together with the *Dura Mater*, which covers the fore Part of the Brain quite to the *Torcular*; for if you ſhould pull in this Place, there would be Danger of tearing the fourth *Sinus*.

The Brain being thus ſtrip'd, I do the ſame Thing to the *Cerebel*, turning back the *Dura Mater*, which covers it quite to the Concourſe of the four *Sinus's*; and ſeparating carefully as well the Lateral *Falces* as the Longitudinal one, I raiſe that Membrane to the Right and the Left, gathering it at the Place of the Torcular, which I ſeparate entirely from the Bodies which encompaſs it. Then indeed you ſee the Brain naked; but you only ſee the Outſide of this Manſion of the Soul; for to contemplate its Inſide, you muſt run through its four Chambers, and ſee what they contain. You muſt by Degrees invert the upper Part of the Brain, or the fore Arch, after it is well ſeparated from the *Cerebel*. By this you diſcover in the firſt Place that Part of the *Medulla Oblongata* which lies between the Brain and the *Cerebel*, embrac'd by the Annular Protuberances, on the Edges of which lie the two Lateral Proceſſes, join'd by the Middle Proceſs.

If you reverſe the Brain a little further, having a Care of cutting the ſmall Veſſels which tie the upper Part to the lower, you will ſee the *Teſticles* and *Nates* or Buttocks. In proceeding to reverſe it, you will come inſenſibly to the Edge of the anterior Ventricles. There you will ſee two Arches of a Bridge, form'd by the Arches of the Roof, and ſupported by three Pillars, two of which are on one Side, and the other in the Middle. This laſt is call'd the *Baſis* of the Roof, and the two other are the Extremities of its Arms, which are ſupported in the *Medulla Oblongata*. Under this Bridge there runs a Torrent of Seroſities, which coming from the third and fourth Ventricle, throws it ſelf into the *Infundibulum*, paſſing firſt under this Bridge of *Varolius*, which is at the Iſſue of the Ventricle, coming from before backwards.

After this I blew with a Tube under the Arms of the Roof, and the anterior Ventricles are very much diſtended. In the mean time I put two Probes over the Arches of the Vault, to raiſe them on both Sides. By Means of this you may very well ſee the Inſide of the Ventricles. The two *Plexus Choroides*, which are ſeated between the Striate Bodies and the Optick Eminence, leaving the former before towards the anterior Extremity of the Ventricles, and the latter and the Optick Eminencies behind towards the poſterior one. You ſee likewiſe the *Septum Lucidum*, in which a ſlight Inciſion diſcovers a ſmall Cavity, which ſome think to be the Seat of the Soul. There are ſome Anatomiſts who make the Inciſion on the other Side of the *Septum*; but I make it on the Roof, deſcending till I come to the Cavity; or I blow gently with a Pipe into the Hole I have made.

In paſſing thus from the Brain to the *anterior Ventricles*, I follow the fourth *Sinus* or *Torcular*, and I find it makes a *Plexus* on the *Glandula Pinealis*, to which it cleaves very cloſe, and that forking it ſelf into two Parts in its Progreſs, it makes Part of the *Plexus Choroides*. To return to the *Glandula Pinealis*, I ſeparate it together with the *Medulla Oblongata*, to which it is only contiguous, as you may find, if you take Pains to cut the Ties.

This Gland is at the Entry of the third Ventricle, into which I introduce a Probe through the Hole call'd the *Anus*, and above *Varolius*'s Bridge, or through the Hole called *Vulva*, and above the ſame Bridge; for theſe are both Parts which lead into the ſame Ventricle. The Probe which is introduc'd, goes out beyond the *Cerebel* above the *Medulla Oblongata*, without hurting the Subſtance of the Brain, as appears plainly enough, if you open the third and fourth Ventricle, to ſee if the Probe has not forc'd a Way by making a Breach thro' this ſoft Subſtance.

But the Communication of the third and fourth Ventricle is manifeſt without opening them, or introducing a Probe, only by blow-

blowing with a Tube through the *Anus*; for then you will ſee that true Cloth which covers the *Medulla Oblongata* between the Brain and the *Cerebel* to ſwell conſiderably, and you will perceive the Breath beneath the *Cerebel* if you put your Hand there, becauſe the Cloth which I mention'd hinders it from going out between the *Teſticles* and the *Cerebel*. If you ſuſpect the Subtilty of the Breath might force a Way where Nature has not form'd any, make Injections, and you will find the Liquor will come out beyond the *Cerebel* above the *Medulla Oblongata*.

If you blow behind the Brain, or make Injections there, forcing towards the third Ventricle, you will ſee the ſame Cloth diſtended, and will feel the Wind, if you put your Hand before the *Anus* or the *Vulva*; or you will ſee the Liquor with which you make the Injections run through theſe Holes. Laſtly, for the better underſtanding the Extent of this, and ſeeing at the ſame Time the Inſide of the *Cerebel*, I ſeparate it well from the *Medulla Oblongata*, by cutting all the Veſſels or Filaments which tie it down; then inverting the *Cerebel* forwards, I ſee perfectly the fourth Ventricle, reſembling in its Figure a Pen pointing backwards.

I diſcover at the ſame Time the two Ends of the Vermicular Proceſs, the Head and the Tail, which are hid under the *Cerebel*, and a little beyond the anterior; and I ſee the Place this Tent is faſten'd to the Roof of the *Cerebel*, by reverſing it a little on the Side; but as long as the Parts may be ſeen without Inciſion, I believe it is beſt to omit it.

The two Pillars of the Roof of the *Cerebel*, the Regularity of the Furrows, and the upper Semicircle of the Vermicular Proceſs, are ſeen without any Operation, as ſoon as the *Dura Mater*, which cover'd the *Cerebel*, is remov'd: But to find the Depth of theſe *Anfractus*, you need only dilate them with the End of the Handle of your Diſſecting Knife, which muſt be made flat like a *Spatula*, and cut at the ſame Time the Filaments which tie together the two Sides of theſe Folds, and you will find that they penetrate to the Callous Subſtance as well as in the Brain, on which you muſt make the ſame Operation to follow its Furrows.

All the exterior Part of the *Medulla Oblongata* may be ſeen without any other Occaſion than what is here deſcrib'd. Thus I demonſtrate the Machine of the Brain to ſhew its Form. Next to know its Matter, I let it ſeeth for ſome Time in a Pot of Water with the Spinal Marrow, which I have taken out of its Sheath, till the one and the other be half boil'd. Then taking them from the Fire, and leaving them to cool, I begin to ſeparate the Filaments of the Spinal Marrow, which is nothing more than a pretty large Bundle of ſmall Nerves, which Way is trac'd by one who is dextrous to the Brain, and its grey Subſtance, where they all end.

At the Extremity of each of theſe Filaments or Nervous Tubes, there is a ſmall Gland. This forms the Animal Spirits by filtring the moſt ſubtle Part of the Blood, and this ſmall Tube is plac'd beneath it to receive this Spirit and diſtribute it. Between the ſmall Filaments which compoſe the Brain, there is a ſoft Medullary Subſtance, which chiefly appears in the Striate Bodies. Some of theſe Filaments which compoſe the Spinal Marrow end in the Brain, and others in the *Cerebel*. The ſuperior terminate in the latter, and the inferior and middle ones in the former. When you have done dividing the Spinal Marrow, the *Medulla Oblongata*, and the Callous Body, you will find theſe three Bodies are no more than a Collection of theſe Filaments, as well in the *Cerebel* as the Brain; and becauſe they are larger in the Callous Body than the *Medulla Oblongata*, and their Interſtices are larger and fuller of a Medullary Subſtance, it muſt not be thought ſtrange that the *Medulla Oblongata* is ſlenderer than the Callous Body, tho' both are no more than a Collection of the ſame Filaments.

I am very much inclin'd to believe, that the Seroſities which run into the Ventricles are ſeparated through this Medullary Subſtance; for it is not probable there ſhould be the ſame Filtre in the Brain for Spirit and Flegm, ſince the Rectification of the one only conſiſts in the Separation of theſe two Subſtances. Laſtly, in purſuing theſe Filaments to their Inſertion in the Glands of the Cinereous Part, one may obſerve the wonderful Ramification they make in the *Cerebel*. You will ſee it ſtill better, if you cut

the Brain from before backward with a very ſharp Razor.

This Inciſion is not made before you examine that fine Contexture which covers the *Medulla Oblongata* between the Brain and *Cerebel*, becauſe if faſten'd to the Roof of this, it is quite torn, and you cannot ſee its Origine. When you have trac'd all theſe Filaments to the Striate Bodies, you will find them thicker, and ſeparated by larger Medullary *Interſtices*, which form theſe Furrows or Channellings whence they take their Name. You will more readily and better diſcover theſe, by making a very ſuperficial Inciſion on theſe Eminencies, and ſcraping away with the Back of the Knife the Aſh-colour'd Subſtance which hides them. I will not ſtand to confute the Opinion of thoſe who ſay theſe Channels are artificial, becauſe if you do not make your Inciſion after a certain Manner, they do not appear; for the ſame Reaſon would prove, that the Structure of every Part is artificial too, becauſe it would not appear without laying it open after a certain Manner.

After having trac'd the Nervous Filaments quite to the Aſh-colour'd Subſtance of the Brain, you will ſee it is nothing more than a Collection of a certain Number of Glands rang'd orderly by one another. This is the Way I take to diſcover the Form and Matter of the Brain. It is a little tedious I confeſs, and requires a great deal of Care; but it is alſo very good, and gives great Satisfaction.

Of the containing Parts of the Head. *From* Verheyen, *&c.*

THE containing Parts of the Head are both Common and Proper. The Common are the ſame with thoſe of the reſt of the Body, which are the *Cuticle*, *Cutis*, *Membrana Adipoſa*, and *Panniculus Carnoſus*. The Skin it ſelf is various in different Parts of the Head. On the *Scalp*, eſpecially the hinder Part of it, call'd *Occiput*, it is very thick and hard; on the Face, it is thin, ſoft and ſmooth; but on the Lips, thinneſt of all. There is very little Fat about the Head. The *Panniculus Carnoſus* is plainly Muſcular in the Forehead of ſome, by Means of which they move the Skin of the Forehead as they will: Others, in whom the Occipital and Frontal Muſcles join their Tendons, can move the whole Scalp of the Head.

On the Outſide of the Head, out of that Part which is call'd the Scalp, ſprings the Hair, which tho' many have taken a great deal of unneceſſary Pains to exclude from the Number of the Parts of the Body, yet being the Product of it, and containing ſomething very curious in their Structure, are worth a ſhort Account. They are obſerv'd by the Microſcope to be hollow, and furniſh'd with a Multitude of Veſſels; and however to us they appear to be ſimple and equal, the Microſcope ſhews them to be knotted like ſome Sort of *Graſs*, and to ſend out Branches at the Joints. Their Cavity has been otherwiſe prov'd by the Diſtemper call'd the *Plica Polonica*, in which the Blood it ſelf has drop'd through the Hairs.

As for the Branching of the Hair, 'tis pretty viſible at the Extremities without a Microſcope; for 'tis very apt to ſplit, as the Hair-Cutters call it, eſpecially if it be worn long, and kept dry. This Diviſion of the Extremity, which to the naked Eye ſeems to conſiſt but of two or three Hairs, by the Microſcope appears to be a Bruſh of Hair. Each of theſe Hairs has a little bulbous or oval Root in the Skin, which ſometimes adheres to it, ſo as to be pluck'd away with it. They are commonly reputed an Excrement, and eſteem'd to be nouriſh'd by ſuch; but whatever the Matter of their Nouriſhment is, it ſeems to be more ſimple than the other Humours of the Body; for long after Death, when all the other Parts and Humours are putrefy'd and corrupted, the Hair will vegetate and increaſe, which it appears to do

as long as any Moiſture remains on the Part.

The Proper containing Parts of the Head are ſtrictly in Number but two, the Muſcles and the Membranes; of the firſt of which we ſhall ſpeak hereafter in its proper Place. Some make two containing outward Membranes, the *Pericranium* and *Perioſteum*, which are in Reality but one double Membrane conſiſting of two Coats, as moſt others do; of which the exterior is by ſome by a diſtinct Name call'd *Pericranium*, and the inner *Perioſteum*, as lying immediately upon the Bone. This Membrane is pretty firmly connected to the *Dura Mater* by ſeveral Fibres tranſmitted to it from that Membrane through the Sutures of the Skull. About the Temporal Muſcles theſe two Membranes part, the outer going over the Temporal Muſcles, and the under remaining ſtill cloſe upon the *Cranium*, which Diviſion, though common to the Proceſſes of divers other Membranes, has occaſion'd their being reckon'd diſtinct, and diverſify'd by two Names. The *Cranium* may be accounted the Baſis of the Head, and therefore not to be reckon'd among the Parts ſimply continent.

Of the Brain. *From the ſame Author.*

AS to the Diſſection of the Brain, we have treated of it already from Mr. *Poupart*. In the vulgar Acceptation it comprehends the whole Contents of the Skull; but in the Senſe of Anatomiſts, it is reſtrain'd to that large globous Part which fills only the fore and upper Part of it, the hinder being poſſeſs'd by the *Cerebellum*, and the under by the *Medulla Oblongata*.

The Brain ſtrictly ſo call'd, is divided by the Duplicature of its Membranes into two equal Parts, commonly call'd Hemiſpheres, though the Brain it ſelf in this reſtrain'd Acceptation be far enough from the exact *Spherical Figure*. The Brain conſiſts of two Sorts of Subſtances, one of a *Cinereous* or Aſh-colour, which being the exterior, is call'd the Cortical Part, which *Malpighius* by his Microſcopes has diſcover'd to conſiſt of innumerable minute Glands of various Sizes and Figures, intermix'd with Abundance of exceſſive fine Blood Veſſels. This Part, by Means of the Fiſſures and Sinuoſities of the Brain, ſeems to enter deep into the Subſtance, though in Reality it does not ſo, and reaches but the Depth of half an Inch or thereabouts, unleſs where the *Anfractus* or Diſcontinuations ſeem to let it in.

The inner Part, which is more ſoft, and very white, is call'd the *Medulla*, and is ſuppos'd to conſiſt of infinitely fine ſoft Tubes, which receive from the Cortical or Glandulous Part the Fluid which it ſeparates, and by Means of the Nerves, which are only Productions of this Part, diſtribute it all over the Body.

As ſoon as the Membranes are remov'd, which is no eaſy Task, upon the Account of the ſtrict Adheſion of the *Pia Mater*, which is ſcarce ſeparable till the Brain begins to putrefy, unleſs it happens to be a Sort of an *Hydropical* Brain, abounding with ſerous Humours. Between the Hemiſpheres of the Brain, under the *Sinus Longitudinalis*, appears a white Subſtance, of a Texture ſomewhat more compact than the reſt of the Medullary Part of the Brain, call'd therefore *Corpus Calloſum*, which runs along the whole Tract of the *Falx*, and receives from each Side the Terminations of the *Medulla*, which is interſpers'd between the ſeveral Windings of the Cortical Part, and is ſuppos'd to be a Sort of Baſis or Support to it.

At the Extremity next the *Cerebellum*, it ſends out two Proceſſes or Legs, by the Juncture of which is conſtituted that Body which is call'd the *Fornix* or *Arch*. Underneath this *Fornix* is found a thin tranſparent Subſtance, differing from the *Fornix* or *Corpus Calloſum* it ſelf only in its *Tenuity* and *Diaphaneity*. From the *Fornix* it is continu'd all along under the *Corpus Calloſum*, dividing the two great Cavities or Lateral Ventricles of the Brain from each other. This Body is call'd the *Septum Lucidum*. In each Hemiſphere of the Brain is a pretty large Cavity, which are call'd the Lateral Ventricles; beſides which, juſt under the *Fornix*, as it were be-

between the Bifurcation of it, is another Cavity call'd the *Rima*, which, though abundantly leſs than either of the other, is reckon'd as a third Ventricle: And between the *Cerebellum* and the *Medulla Oblongata* is a fourth, which are call'd the four Ventricles of the Brain. In the Lateral Ventricles on each Side appear the *Corpora Striata* and the *Ala* of the *Plexus Choroidalis*, which belonging to the *Medulla Oblongata* and the Blood Veſſels, ſhall be deſcrib'd in their proper Places.

The *Medulla Oblongata* is the *Medullary* Part of the *Cerebrum* and *Cerebellum*; the fore Part of it from the Brain, the hinder from the *Cerebellum*. It lies upon the Baſis of the Skull, and is continued through the great Perforation of it into the Hollow of the *Vertebra* of the Neck, Back and Loins: But after its *Exit* from the Skull, it is call'd by another Name, *viz. Medulla Spinalis*.

The *Cerebellum*, ſo call'd from its Diſtinction from the Brain both in Size and Situation, has been look'd upon as a little Brain by it ſelf, and is placed in the hinder and lower Part of the Skull, underneath the hinder Part of the Brain. It conſiſts, as the Brain does, of a Cortical and Medullary Part, the ſeveral Branches of which latter reſemble (when open'd) thoſe of a Tree, and meeting in the Middle, form a Kind of a Stem which runs quite through it.

The *Medulla Spinalis*, or Spinal Marrow, is little more than a Production of the *Medulla Oblongata*, or Medullary Part of the Brain. It conſiſts, as the Brain does, of two Parts, a White or *Medullary*, and *Cinereous* or *Glandulous*, but with the Poſition inverted: For whereas in the Brain the Cinereous Part is the exterior every where, except in Part of the *Baſis*, in the Spinal Marrow it is ſurrounded with the White Part, by which Contrivance any unneceſſary Reflexion of the Nerves is avoided, and they go immediately out from the *Medullary* Part, which they could not have done, had the *Cineritious* been external as in the Brain. Out of the *Medulla Spinalis* ſpring Thirty Pair of Nerves, which are nothing but *Faſcicles* of Medullary Fibres cover'd with their proper Membranes. The Ten Pair of Nerves are the Offspring of the *Brain*, *Cerebellum*, *Medulla Oblongata* and *Spinalis*, the Account whereof hath already been deliver'd.

An EXPLANATION *of the Figures relating to the Veſicles and Veſſels of the* Lungs, *as alſo the Muſcles and Tunicks of the* Oeſophagus, *being a Continuation of that in* November, *page* 576.

TAB. VI.

Fig. I. *The great Lobe of a Sheep's Lungs, the upper Part being whole, the lower freed from its little Membranes whereby the internal Lobules adher'd.*

A. The Orifice of the Branch of the *Aſpera Arteria.*
B. The Orifice of the Branch of the Pulmonary Vein.
C. The Orifice of the Branch of the Pulmonary Artery.
D. The ſame Branch of the *Aſpera Arteria*, to which the internal Lobules join like a Cluſter of Grapes.
E. The leſſer Branches by which they paſs to the ſaid Lobules.
e, e. The internal Lobules, according to *Willis.*
f, f. The Lymphatick Veſſels running thro' the external Superficies of the Lungs. From *Willis.*

Fig. II. *The mutual Union of the* Bronchia *and Blood Veſſels.*

A. The larger Branch of the *Aſpera Arteria.*
a, a. The leſſer Branches cut off.
B. The larger Branch of the Pulmonary Artery.
C. The larger Branch of the Pulmonary Vein.
D. The Bronchial Vein and Artery.

Fig. III. *A Branch of the Pulmonary Nerve explain'd, in which by the Letter A. is deſign'd another Branch, from* Willis, *that is longer and broader.*

Fig. IV. *The Muſcles and Tunicks of the* Oeſophagus.

A. Muſculus Oeſophagæus.
B. Muſculus Stylopharyngæus.
C. Muſculus Sphænopharyngæus.
D. Muſculus Cephalopharyngæus.
a. The Entrance into the Gullet.
E. The outward Tunick or Coat thereof.
F, G. Its Muſculous Coat.
F. The external *Lamella* of the ſame Coat.
G. The internal *Lamella.*
H. The Vaſculous Coat.
I. The Glandulous Coat.
K. The Nervous Coat.
a, a. The ſuperior Coats laid aſide, that the internal may reſpectively appear.

Fig. V. *The internal and hairy Superficies of the Gullet.*

Fig. VI. *The Muſculous Coat of the Gullet, from the fore Part of an Ox.*

Fig. VII. *The ſame Coat from the hind Part.*

A. The external Order of the Fibres.
B. The internal Order of the Fibres.

An EXPLANATION *of the Figures contained in the Seventh Table, wherein the internal Parts of the* Head *are diſcover'd, as the* Meninges, Cerebrum, Cerebellum, *and* Medulla Oblongata, *with their Veſſels; and Two Figures, which demonſtrate the Structure of the Hair, and its Veſſels; from* Blancard, *who took them from* Bidloo.

TAB. VII.

Fig. I. *The Head, where the* Cranium, *and great Part of the* Meninges, *are taken away.*

A. Part of the *Meninges* that remains.
a, a. Its proper Veins and Arteries.
B. The *Cerebrum* contain'd in the *Pia Mater.*
C. The Sagittal *Sinus.*
b, b. Its Branches running through the *Cerebrum.*
D, D. The two Lateral *Sinus's.*

Fig. II. *The* Sinus *of the hard* Meninges, *with the* Falx, *and Part of the Jugular Veins, as if they had been ſeparated from the reſt. From* Bourdon.

A, A. Part of the *Cranium.*
B. The great *Foramen* of the *Occiput* Bone.
C. The Sagittal *Sinus* open'd, wherein a Sort of Valves appear.
D, D. The two Lateral *Sinus's.*
E. The fourth *Sinus* cut off.
F. The great Branch of the fourth *Sinus* running by the inferior Part of the *Falx*, ſometimes the leſſer Sagittal *Sinus.*
G, G. The two crooked or winding *Sinus's*, where the *Sinus* of the *Meninges* falls into the Jugular Veins, to hinder or give a Check to the *Impetus* of the Blood, which, ſays *Verheyen*, I have not found to be ſuch.
H, H. The Jugular Veins cut off.
a, a. The *Falx*, with the Branches of the Sagittal *Sinus.*
b, b. The Branches with which the Lateral *Sinus's* communicate with the Vertebral.
c, c. The Branches to the Pituit Gland.

Fig. III. *The inferior Part of the* Cerebrum *taken from the ſuperior, that the Cavities may appear.*

A, A. The Cortical Subſtance of the Brain.
B, B. The Medullary Subſtance.
C. Part of the *Corpus Calloſum*, under which lies the *Fornix* and *Septum Lucidum.*
D, E. The other Lateral Ventricle of the Brain, which
D. Is the *Corpus Striatum*, and
E. The other Part of the *Medulla Oblongata.*
d. The

d. The Blood Veſſels running externally through the *Corpus Striatum.*
e. The *Ala* of the *Choroide Plexus.*
F. The *Dura Mater* turn'd back.
G. The fourth *Sinus* partly taken out.

Fig. IV. *The whole Bulk of the Brain taken out of the Skull and inverted, ſo that the Egreſs or Going out of the Nerves may be ſeen.*

A. The *Cerebrum* ſtrictly ſo call'd inclos'd in the *Pia Mater.*
B. The *Cerebellum* inclos'd in the ſame Tunick.
C, D. The *Medulla Oblongata.*
D. The Protuberance of the *Medulla Oblongata,* call'd by *Willis* the Annular Protuberance.
E. The Arachnoide Tunick.
a. The internal Branch of the Carotid.
b. The *Infundibulum.*
c. A Sort of Glandulous Bodies near the *Infundibulum.*
d. The Meeting of the Carotid Branches with the Cervical.
e, e. The Cervical Arteries.
f. A Branch from the Concourſe of the Cervical Arteries extended along the Spinal Marrow.
1, 2, 3, 4, 5, 6, 7, 8, 9, 10. So many Pair of Nerves inclos'd in the *Medulla* entring out of the Skull.

Fig. V. *The* Baſis *of the* Skull, *where it is ſhown after what Manner the Veſſels of the* Cerebrum *going out of the* Skull, *are hid under the* Dura Mater. *From* Willis.

A. The Pituit Gland.
a. The internal Branch of the *Carotid Artery.*
b. The *Infundibulum.*
c, c. The Nerves approaching to the *Par Vagum.*
1, 2, 3, 4, 5, 6, 7, 8, 9, 10. A Continuation of the Nerves as before.

Fig. VI. *The Subſtance of the Brain as it has been diſcover'd by the Microſcope.*

A. The Teguments of the Brain.
B. The Glands of the Cortical Subſtance of the Brain.
C. The Channels or ſmall Pipes of the Medullary Subſtance.

Fig. VII. *Part of the Hair view'd with the Microſcope.*

A. The Hair, whoſe Structure ſeems to be form'd of ſeveral Knots or round Lumps.
B. Part of the Cuticle adhering to the Hair.
C. The Root of the Hair.
d, d. Fibrils, as it were ſmall Branches of Hair.

Fig. VIII. *A ſmall Part of a Humane Hair, in which may be ſeen by a Microſcope the Multiplicity of little Veſſels join'd together, and admirably wove as it were into Nets.*

TAB. VIII.

Explains all the internal Parts of the Cerebrum, Cerebellum, *and* Medulla Oblongata.

Fig. I. *By taking away the upper Part of the* Cerebrum, *the* Fornix *appears reflected.*

A. The Cortical Subſtance of the *Cerebrum.*
B. The Medullary Subſtance.
C. The *Fornix* brought forward.
D. The Striate Body cover'd with its Blood Veſſels.
E. The fourth *Sinus*, with its Branches and Arteries extended upon the *Glandula Pinealis.*
d, d. The *Choroide Plexus*, with its Glands.
F, F. The *Cerebellum.*
G. Proceſs of the *Meninges.*

Fig. II. *Taking away the* Fornix *and* Choroide Plexus, *there remains,*

A. The external Subſtance of the *Cerebrum.*
B. The Sides of the Cavity of the Brain.
C. The Striate Body ſhav'd off.
D. The Striate Body entire.
E, E. The *Crura* of the *Medulla Oblongata* ſo divided, that the following Things may appear:
a. The Blood Veſſels proper to the *Corpus Striatum.*
b. The Baſis of the *Fornix* cut off.
c. The Chink to the *Infundibulum.*
d. The round Hole to the fourth Ventricle.
e. The *Glandula Pinealis.*
f. The Medullary Proceſſes, like Strings, all going under the Gland.
g. The *Nates.*
h. The *Teſtes.*
F, F. The Cortical Subſtance of the Brain.
G, G. The Medullary Tracts of the Brain.
H. The End of the *Medulla Oblongata.*
I, I. The Medullary *Pedunculi* from the *Medulla* of the Cerebel as it approaches the *Oblongata.*

Fig. III. *The Baſis of a Sheep's Brain, in the Parts of which ſome being ſhav'd off, and others expos'd naked, the Medullary* Striæ *appear as it were ſo many Nerves. From* Willis.

A. The Mamillary Proceſs.
B. The remaining Part of the Brain diſſected.
C. The *Corpus Striatum.*
D, D. The *Thalami* of the Optick Nerves.
d. The Tract to the *Infundibulum.*
E. The Gland ſeated behind the *Infundibulum*, which in Men is double.
F, F. A Continuation of the Shank of the *Medulla Oblongata* lying under the Orbicular Prominencies.
G, G. The Optick Nerves.
H. The Annular Proceſſes ſurrounding the *Medulla Oblongata* near the *Cerebellum.*
I, I. The Tranſverſe Medullary Tracts, diſtinguiſhing the Regions of the *Medulla Oblongata.*
K, K. The Hemiſphere of the *Cerebellum* ſhav'd off.
L. The Extremity of the *Medulla Oblongata* falling into the Spine.
M. The Top of the Spinal Marrow.

Fig.

Fig. IV. *The fourth* Sinus, *with the* Choroide Plexus.

A. The fourth *Sinus* diſſected near its Riſe.
B. Its Diviſion, conſtituting chiefly the *Choroide Plexus* into *Branches.*
C, C. The *Alæ* of the *Choroide Plexus.*
D, D. The Arteries approaching the Branches of the *Sinus*, and making with them the *Plexus Choroides.*
d, d. The leſſer Arteries extended upon the *Glandula Pinealis*, with the Branches of the fourth *Sinus.*

TAB. IX.

Shows the Medulla Spinalis, *with the Egreſs of the Nerves, and the wonderful Texture and Union of the Veſſels.* Fig. III. IV. *and* V. *immediately taken from* Willis, *and Two from* Blaſius.

Fig. I. *The Spinal Marrow taken from its Bony Channel, and half freed from its Teguments, that the Going out of the Nerves may be ſeen.*

A, A. The *Dura Mater* turn'd back breadthways.
B, B. The Arachnoide Membrane.
C, C. The Spinal Marrow incloſ'd in the fine *Meninges.*
D, D. The Arteries and Veins of the Spinal Marrow, which join as well with thoſe of the Neck as of the Deſcending Trunk of the *Aorta.*
1, 7. The Nerves from the *Medulla* of the Neck.
8, 19. The Nerves from the *Medulla* of the Back.
20, 24. Nerves from the *Medulla* of the Loins.
25, 30. Nerves from the *Medulla* of the *Os Sacrum.*
a. The Solitary Nerve.
b, b. Nerves going out of the *Pia Mater.*

Fig. II. *A Dog's Brain cut croſſways.*

A. The whiteſt Subſtance.
B. The blacker Subſtance.
C C. The Teguments turn'd back.
F. A Nerve from the ſuperior Part *D.* as well as the inferior *E.*

Fig. III. *The Vertebral Arteries, and their Branches into the back Region of the* Medulla Oblongata.

A, A. The back Region of the *Medulla Oblongata.*
B. The common Duct making an Union from both Vertebral Arteries.
C. A Rhomboid Figure, which in Brutes deſcribes a double Coalition of Arteries.
D. The firſt Coalition of Arteries, from which the Spinal Artery deſcends.
E. The Axillary Artery.
f. The Cervical Artery.
g, g. Arterial Shoots or Branches into the Muſcles of the *Cervix.*
h, h. Shoots into the Spinal Marrow, which enter on both Sides into the Spinal Artery upon every ſingle Juncture of the *Vertebræ.*
i, i. Arterial Shoots, which from the Channels of the *Sinus's* form an Arterial *Plexus*, expreſs'd *Fig. V.*
k, k. Two Arteries ſent into the Spine directly from the *Aorta.*
l, l. The Spinal Artery.

Fig.

Fig. IV. *Repreſents the Vertebral Veins and* Sinus's.

A. The Sagittal *Sinus*, where it paſſes into the Lateral *Sinus*, cut off.
B, B. The Lateral *Sinus's* of the hard *Meninges.*
C, C. The round Holes where the Lateral *Sinus* comes both Ways into the Jugular Vein.
D, D. The Jugular Veins.
E. The upper Juncture of the Vertebral *Sinus's.*
F, F. The Ducts between the Lateral *Sinus's* of the Head and the Vertebral.
G, G. The Communication of the *Sinus's* and all the Veins at the Top of the Spine.
H, H. The Venous Duct from the Meeting of the *Sinus's* and Veins into either Jugular Vein.
h, h. The *Anaſtomoſes* betwixt each Vertebral Vein and *Sinus.*
i, i. The Vertebral Veins cut off near their Riſe.
k, k. The Venous Ducts that are carried forward beyond the *Vertebræ*, brought from a Vein of that Side to a like on the other.
L, L. The Venous Ducts bringing back Blood from the Spinal Marrow into the *Sinus.*
m, m. The Venous Channels bringing back Blood from the Muſcles of the *Cervix.*
n, n. The Venous Ducts that are continued into the Branches of the *Venæ Azygæ*, and laſtly into the *Lumbares.*

Fig. V. *The Spinal Arteries taking from the ſame Subjects as the Veins.*

a, a. Branches of the Cervical Arteries into the Spinal Marrow.
b, b. Inferior Branches of the *Aorta* into the Spinal Marrow.
c, c. Shoots thereof into the back Part of the *Medulla.*
d, d. The ſame Shoots into the fore Part.
e, e. Double Arterial Shoots, that communicate both Ways with the next of the ſame Side, and by the tranſverſe Proceſs with an equal Branch on the other Side.
f, f. The ſaid Proceſſes, which join the Arteries on both Sides.
g. Little Arteries going out of the *Os Sacrum.*
h, h. Arterial Shoots into the *Meninges* of the Head.
i, i. Arterial Shoots going out of the *Cranium* with the Auditory Nerves.
k, k. Shoots into the *Rete Mirabile.*

TAB. X.

Shows ſeveral Figures, whereby the Motion of the Muſcles may be underſtood, and conſequently Reſpiration. The firſt Five Figures are produc'd, that it may be ſhown how great a Contraction is made from a ſmall Shortening of the Muſcles; and by the Third Figure, what makes a Tonick Motion.

A. Fig. I. *Part of the Trunk of a Humane Body.*

B, C. The Arm extended with the Hand to it.

Fig. II. *The ſame as the Firſt, only that the Arm is bended, and the Hand ſet againſt the Breaſt.*

Fig. III. *Some Muſcles, with which the Elbow is bent, and the Arm extended.*

A. The *Scapula* cover'd with ſeveral Muſcles, with which the upper Part of the Arm is extended.
a. The *Humerus* or ſingle Bone of the Arm.
b. The *Radius* it ſelf.
c. The Elbow.
d. The Head of the Muſcle *Biceps* bending the Elbow.
e. The Tail of the ſaid Muſcle; but while this Muſcle is ſomething ſhorten'd, and the Shoulder a little depreſs'd, the Hand, by the Action of the Muſcles, is carried to the Breaſt, as in *Fig. II.*
f. The Muſcles extending the Elbow.
g, h. Two Muſcles of the Elbow and Hand, the Riſe of which is from the lower Tubercle of the Arm; but when theſe Muſcles act together, the Arm is extended with the Hand, as in *Fig. I.*

Fig. IV. *The Connexion of the Bones of the Elbow and the* Radius *with the Shoulder-Bone or* Humerus, *that it may appear how ſmall a Shortening of the Muſcle is made while the Hand is carried to the Breaſt, as in* Fig. II.

a. The lower Part of the Shoulder-Bone.
b. The upper Part of the Elbow.
c. The upper Part of the *Radius.*
d. The internal *Sinus* of the *Humerus*, that receives the following Proceſs:
e. The leſſer or internal Proceſs of the *Radius*, which in the great Bending of the Elbow is receiv'd from the *Sinus d.*

It could not therefore in the greateſt Bending of the Elbow be here bent more, than that it touch the Bottom of the ſaid *Sinus*, and it appears cloſer in the live Subject than the Skeleton, becauſe the Cartilage that unites them is then wanting.

Fig. V. *Demonſtrates Mechanically, that a ſmall Motion about the Center makes a great one in the Circumference.*

a, f. A Staff of a hard Subſtance, with its Handle, that turns round the Pin *b.*
f. The Point, to which is fix'd a little Cord *d.*
b. The Pin about which turns the Handle of the Staff *a, f.*
d. The ſmall Cord fix'd to the Point *c.*
c, e. Part of the Circle that deſcribes the Point *c.* while it draws the Cord *d.*
f, g. Part of the Circle, which at the ſame Time deſcribes the End of the Staff *f.* ſo that whilſt the Point *c.* is mov'd in *e.* the End of the Staff *f.* is mov'd in *g.*
h. The Hand that draws the Cord *d.*

Fig. VI. *Several Fibres of the Muſcles.*

a. The Carnous Fibres.
b, b. The Tendinous Fibres.
c, c. The Membranous Fibrils, into which the Spirits flowing, make an Angle outward from the Fibres *a, b.* and ſo the Muſcle is ſhorten'd.

Fig.

Fig. VII. *A few Fibres from the aforeſaid Muſcles, whoſe Carnous Folds are rather curled, and the Angles more crooked, and therefore the whole Tract ſhorten'd.*

a. The Carnous Fibres inflected, which, to prevent Confuſion, are mark'd by a little Line.
b, b. The Tendinous Fibres.
c, c. The Membranous Fibres.
d. A Nerve, from whoſe Filaments the Spirits flow into the Membranous *Fibrillæ*, which, by throwing them into the Carnous Fibres, make them bend.

Fig. VIII. *A Pair of Bellows, in which is inclos'd a Sheep's Lungs, where the* Aſpera Arteria *is ſo fix'd to the Neck thereof, that nothing can enter the Bellows but what enters the Lungs; but the upper Part is repreſented as if Glaſs, that the ſaid Lungs may be ſeen through.*

Fig. IX. *A Bow reſting upon a Plain, both Ends whereof are turn'd in a fix'd Handle.*

a. The Bow lying flat.
b. The Bow elevated to make the Shadow *d.*
c, c. Two Handles, in which the End of the Bow are turn'd.
d. The Shadow made by the Elevation of the Bow.

Fig. X. *and* Fig. XI. *Part of the* Thorax, *with the Ribs and Intercoſtal Muſcles. The firſt Figure demonſtrates them as they appear in Expiration, and therefore in the Conſtriction of the Breaſt; the latter as in Inſpiration, that is the Dilatation of the Breaſt.*

a, a. The Ribs ſeen in Part.
b, b. The external Intercoſtal Muſcles.
c. The lower Intercoſtal Muſcles.
e. The Ribs on the other Side, to wit, ſuch as are not turn'd to the Eye.
f. The *Sternum*, with the Cartilaginous Ribs.

Fig. XII. *A Pair of Bellows, having a Hole in the Belly, to which is fix'd the Mouth of a large Bladder, that flags or grows lank when the Bellows take in Air.*

a. The Bladder it ſelf flapping together upon the Drawing in of Air, or Inſpiration of the Bellows.

Of the Diſeaſes of the Head, *and their Cures. From* Michaelis, Willis, St. Hilaire, Cole, *&c.*

BEfore we enter into a Detail of the Diſeaſes of the Head, we ſhall ſay ſomething of Pain in general, it being an Affection common to all the Senſes; for as *Etmuller* ſays, it is made by Touching, or an Impreſſion of a ſenſible Object upon the immediate Organ, which Impreſſion is ſeconded from a certain Motion of the Spirits in the Organs, which is call'd Senſe. If there is ſo violent an Impreſſion made upon the Organ, that its Motion is too great, and the Vibrations too burthenſome, the Spirit is by Conſequence agitated with Rapidity and Vehemence; from whence follows that troubleſome Senſe that ariſes from an Impreſſion againſt Nature, and too forcible a Stroke upon the Organ, which is commonly call'd **Pain**: So a ſudden Light ſtriking from Darkneſs upon the *Retina* of the Eye, makes the Sight painful; and a violent Motion upon the Membrane of the Ear, gives inſtantly the Ear-ach, and ſuch an Uneaſineſs and grating Pain as we feel when a Muſical Inſtrument is out of Tune.

There are Ten Sorts of Pains uſually eſtabliſh'd. The Firſt is a Pain with Oppreſſion, in which one feels a Kind of Weight upon them. It happens to Parts that have little or no Senſation in them, as the Liver when affected with the *Scirrhus*, and the Kidneys with large Stones that are fix'd. The Second is a pricking Pain. This is more particular in the Membranes, which is like the pricking with Pins, or other ſharp Inſtruments. Such is the Pain we feel in a Pleuriſy. The Third is an acute Pain, which has ſome Relation to the former, and is ſhown in the Gout, *Eriſipelas*, Colick, Head-ach, *&c.* The Fourth is Pain with Pulſation, ſo call'd from the Beating of the Artery, and according as that increaſes, ſo does the Pain. It happens when the Motion of the Blood through the Arteries is ſtop'd in ſome tender Part, particularly with the Maſs of Humours, as in Tumours that ſucceed. This Kind of Pain is proper to Inflammations, as for Example, in ſuch a one as is occaſion'd by a Thorn ſtuck in the Finger. The Fifth is the Pain of breaking a Bone, or where the Membrane that inveſts the Bone call'd the *Perioſteum*, is affected and prick'd by a viſcous Acid, that ſticks in thoſe Parts, and excites the Pain. The Sixth is a Pain with Tenſion, peculiar to Membranous Parts, when any Flux of Humours fall upon and diſtend them, till this Senſation is produc'd; ſuch as happen to the Belly in *Wind Colicks*, *Tympanies* and *Aſcites*. The Seventh is a biting or gnawing Pain, like as when Worms and other Vermin feed upon us. The Eighth is a ſcratching Pain, juſt as if our Skins were claw'd with Nails, and this is common to Scorbutick Perſons. The Ninth is a Pain with Heat, or it is like Sparks of Fire that burn us. It depends on an acrid, ſubtle and volatile Acid, that affects the Fibrous and Membranous Parts like a Cauſtick. The Tenth is a ſtiff benummed Pain, that comes from an Acid that is ſomething acrid, and that alters the Fibres after a ſingular Manner, giving them a Kind of Stupefaction or Numneſs.

The *Head-ach* is either external or internal. The external affects the *Pericranium*, and the internal the *Meninges*. Both one and the other are ſenſibly felt by the Eyes, becauſe the *Cornea* and *Uvea* receive their Membranes from the *Meninges*, and the Conjunctive has its Membrane from the *Pericranium*. This Pain is divided into Five Kinds, the Cephalalgy, *Cephalæa*, Megrim, the Egg, and the Nail. The Firſt is a very ſevere periodical Pain, that ſeizes the whole Head, and is us'd to be troubleſome after hard Drinking, in burning Fevers, and Change of Air, but laſts not long. The *Cephalæa* is a continued obſtinate Pain of the Head, that is fix'd or rooted in ſome particular Part. The Megrim is a periodical Pain, uſually long and rebellious, that only ſeizes half of the Head, from

from the Sagittal Suture that divides the Head into two Parts, the other half being without Pain. The Egg is a Pain in one Part of the Head, betwixt the Sagittal Suture and the Temporal, ſo nam'd becauſe the Part pain'd is no bigger than an Egg. The *Nail* is a Pain that extends no further upon the Skull than the Size of a Nail, where it fixes, and remains like a Nail ſtuck in. It differs from the other in the Bigneſs of the Part affected, and becauſe the Pain of the Egg is much greater and more violent; inſtead whereof this is conſtant, and reſts upon the ſame Spot, except ſome external Means increaſe it by Accident.

It happens ſometimes that the *Occiput* or hind Part of the Head is afflicted, eſpecially in Women, and the Pain is then join'd with ſuch a Senſe of Cold, as if Ice was lock'd up in the Part. This Indiſpoſition ariſes from a Communication and Conſent of the Womb. Old People, as well Men as Women, are ſubject to ſuch a like cold Pain in the *Sinciput*; but it is from another Cauſe.

The Prognoſticks are, that if the Urine be crude, that is to ſay, white and clear, it is an ill Sign in a great Head-ach upon an acute Fever. A ſtrong Head-ach, that is quickly gone without any manifeſt Change, is mortal, and a Sign of a Gangrene in the Brain, or an abſolute Loſs of Senſe in the Membranes thereof. For the external Parts to be cold in a Head-ach, are bad Signs. The Pain being continual and vehement at the Forehead and Temples with an acute Fever, and a Symptom appearing the fourth Day, betokens Death on the ſeventh. If from the Pain of the Head ſome plain Excretion ſucceeds, as Water, Blood or *Pus*, from the Mouth, Noſe or Ears, there are many Examples that it is a Sign of Health. If after the Cure of the Diſeaſes of the lower Parts, there ſucceeds a violent Pain of the Head without any manifeſt Excretion, it ſhows an Abſceſs in the Brain. If in a Fever join'd with the Head-ach, there be a Complaint of a Pain at the Heart, Stitches or Contractions of the Breaſt, there follows a Bilious Vomiting. A heavy ſleepy Head-ach is dangerous to Women with Child.

If by ſome Prick or Rent the *Dura Mater* ſuffer an Inflammation, one preſently perceives a Pain and Weight upon the Part, the Eyes become bloated and inflam'd, the Face is red and ſwell'd, the Patient is dull and ſleepy, the Fever breaks out, he has a trembling Pulſe, and the Blood flows ſometimes by the Noſe, Ears or Mouth, which happens alſo in any grand Diſorder of the Brain. If the Bones of the Skull be ſunk, or rather that the Pieces of the Bones are ſcatter'd, ſo that we may judge they have drawn Blood, we may ſay the *Dura Mater* is wounded. If the Inſtrument with which the Wound is made be ſharp, and the Fracture large, one may ſay the *Dura Mater* is cut. If the Bone is crack'd, and the Patient grows drowſy, if Blood flow from the Mouth, Ears or Noſe, or rather if the Fever increaſes or ſhows it ſelf, we may judge the Matter reſts upon the *Dura Mater*, which compreſſes the Brain, from whence is felt a ſenſible Weight. The Eyes are bloated and inflam'd, becauſe the *Sinus* of the Baſis of the *Cranium* coming from the *Dura Mater*, receives all the Reſidue of the Blood that comes from the Veins that are diſtributed to the Eye. If the *Dura Mater* ſuffer any Inflammation, it is communicated to the *Sinus*, and that oppoſes the Return of Blood which the Veins us'd to bring from their little Reſervatories; and as the Arterial Blood preſſes to empty it ſelf into the Veins, it is neceſſary that the Ball of the Eye, which is preſs'd by the Flux of the Arterial Blood, and the Stoppage of the Venal, ſhould ſwell, grow bigger, and be inflam'd.

As to the Fever that attends Wounds or Hurts of the *Dura Mater*, it proceeds from the *Pus* which enters into the Blood, where in a little Time it produces an Effervеſcence and Ferment, which increaſes its Motion as well as Heat; and as often as the Blood is ſupply'd with any freſh purulent Matter, the Paroxyſms will happen. This ſharp Matter coming in a ſhort Courſe of Time to enter into all the Parts of the Body, pricks the Nerves, irritates the Membranes, and enters ſometimes into one Muſcle, and ſometimes into another, which occaſions Shiverings, Vomiting, irregular and convulſive Motions; which are Signs that the Maſs of Blood is infected, that the Courſe of the Spirits are powerfully agitated, and that the *Delirium* and the Lethargy will ſucceed.

The

The great Inequality of the Courſe of Blood in the Return of the Fever, and the extravaſated Matter that begins to penetrate and break the Subſtance of the Brain, cauſes the *Delirium*; for when there is a great deal of Blood diffus'd or ſpilt upon the Brain, which is in an extraordinary Motion and Alteration, this will produce a Lethargy: The Weight of the extravaſated Blood preſſes upon the Brain, and the great Agitation of it makes it, that the groſſer Parts are lock'd up from the more Subtle that ſhould aſſiſt them to enter into the Pores of the Glands, and that cloſes the Paſſage of the Spirits, ſo that the Brain is found oppreſs'd by the Weight of the Matter, and the Patient falls into a profound Drowſineſs.

But when this extravaſated Matter is diſſipated, and the groſſer Parts freed by the Impulſion of New Blood; the Spirits move with ſuch Force, and ſo confuſedly into all the Parts, that it revives the Frenzy, which ſucceeds a Lethargy juſt as a Lethargy does the Delirium. In this kind of Lethargy, the Eyes are ſometimes open'd and diſturb'd. The *Apoplexy* comes from the Blood, being carried to the Brain with ſuch Impetuoſity, ſo that the extravaſated Matter being collected in ſuch great Quantities, interrupts by its Weight the Courſe of the Spirits, and forces the *Sinus* from the *Dura Mater* to overflow from all Parts; ſo that hindring the Arteries from emptying themſelves into the Veins or the *Sinus*, the Brain is found ſo preſs'd on all Sides, that the Patient falls into an *Apoplexy*, and Death is then near at Hand.

The Liver and the Lungs impoſtumate in the great Wounds of the Head, by Means of the *Pus* that comes from the Brain into the Maſs of Blood, and from thence into the Lungs. The Wounds of the Brain become ſo much more dangerous as they are nearer to the *Medulla Oblongata*, becauſe ſuch Wounds affect abundance of the nervous Filaments that are in that Part.

If Vomiting happens during the *Delirium* and the *Lethargy*, it is a mortal Sign; becauſe it is a Token that the Spirits which nouriſh and ſupply the Brain have forſaken it, to throw themſelves into other Parts of the Body, and eſpecially the Ventricle. If a grinding of the Teeth happens, it is a Sign that the extravaſated Blood is corrupted, and that the white Subſtance of the Brain is broke. Wounds of the cineritious Subſtance of the Brain are not always Mortal, eſpecially when the Breach in the Skull is pretty large, that Remedies can be apply'd; but if the Wound penetrate into the white Subſtance, it is almoſt always Mortal, becauſe that Part is compos'd of an Infinity of fine Nerves that are cut, and likewiſe becauſe it is impoſſible to convey Medicines to that Part, without cutting ſome large Branches of the Arteries that are conceal'd in the Foldings of the Brain, which would occaſion a Flux of Blood that could not be ſtop'd.

Sleep and Waking are perform'd after this Manner, according to *Etmuller*: As the animal Spirits, when they are mov'd regularly and follow their natural Subtilty, they readily receive the Impreſſion of ſenſible Objects, and enter into the Paſſion of Senſe, wherein they perform various Motions, in which State the Animal is ſaid to be awake: The Privation or Loſs of this Condition is Sleep. And theſe Two Things follow one another mutually by a neceſſary Viciſſitude or Alteration.

If this mutual Viciſſitude ceaſe, ſo that Sleep forſakes them, and Waking is continual, which is a Diſeaſe call'd by the *Greeks*, *Agrypina*; by the *Latins*, *Vigilia Nimis*, *Inſomnia*, or exceſſive and immoderate Waking, which is an extraordinary and continued Motion of the animal Spirits in the external or internal Organs of the humane Machine, by reaſon of which the Spirits readily receive the Impreſſions of ſenſible Objects. The Occaſion of this continued an immoderate Flux in the Spirits is, firſt, the ſenſible Object that ſtrikes upon the Organ with too much Force; or 2*dly*, the Diſorder of the animal Spirits that are too agile.

As to the Firſt Cauſe, when any Object ſtrikes upon the Organ too forcibly, the animal Spirits are neceſſarily agitated and move powerfully; and theſe Emotions are convey'd to the Brain by the Nerves, which give the ſame Action to the Spirits in the Brain, that makes Waking neceſſary to the Animal. In like manner, great Noiſe, Pains, Coughs, Cares and Thoughts,

Thoughts, make Men wake, and we find Waking familiar to melancholy and mad People.

The Second is the Fault of the animal Spirits, that are diſpos'd to too precipitate or obſtinate Motions; ſuch as too great Heat, as in ardent Fevers, or the Poiſon of malignant ones: The Paſſions of the Mind, Love, Fear, Anger, *&c.* long Faſting or too ſpirituous and volatile Feeding that diſturb the Spirits, and act with ſuch Rapidity in the Brain, that they neceſſarily occaſion Waking.

In chronick Diſeaſes, eſpecially in Melancholy, Watchings, laſt along Time without Danger. Extraordinary Sleepineſs is when the Patient is too drowſy, or actually overſleeps himſelf. As natural Sleep depends upon leſſening the Motion of the animal Spirits in the external Organs, and the Fettering of them, that they be neither too volatile nor too ſubtle, but flegmatick and ſlow, juſt to perform the requiſite animal Motions, unnatural Sleep, or ſuch as is contrary to Nature, depends on the too great Curbing or Deadneſs of the animal Spirits. 'Tis ſaid, that the Influence of the Spirits in the external Organs is abated in natural Reſt, to wit, in Compariſon to their Action while awake, but it is not loſt ſince Sleep refreſhes the external Part. In the external Organs during Sleep, the internal Spirits are more agitated in the Brain, which gives Occaſion to divers Dreams. The ſoporous or ſleepy Affections, are the *Carus*, the *Coma Vigilia*, or *Cataphora*, the Lethargy and *Catalepſis*.

The *Carus* is a deep Sleep, attended with Snoaring, ſo that it is a Trouble to wake 'em, Reſpiration at the ſame Time free and entire; it is occaſion'd from Vapours and Fumes of Wines, Coals, Quicklime, and Tobacco, which numm and fix the Spirits; ſo falls from on high, Contuſions of the Head, and Concuſſions of the Brain will produce it.

The *Coma Vigilia*, or *Cataphora*, is not properly a Diſeaſe, but a Symptom and a Sleepineſs contrary to Nature, that happens ſometimes to Fevers, both continual and malignant, that intermit towards the End of the Fit, where the Sick has a great Inclination to ſleep, and at the ſame Time ſleep ſoundly: It is call'd *Coma Vigilia*, becauſe of the Waking that attends it, tho' the Patient ſleeps effectually as to his Habit of Body, and the Organs of external Senſe, and really wakes in regard of the internal animal Operations; or rather is agitated by Dreams, wherein he talks aloud, throws his Arms and Legs from one Side to another and anſwers impertinently to what is ask'd him by thoſe about him.

The *Lethargy* is a profound Sleepineſs, with a ſlow Fever, wherein the Sick ſleep, and if they are wak'd, they return preſently to their former State; they are ſtupid and without Memory, ſo that if they ask for any Thing, before you can well give it them, they are faſt aſleep again. There are a Sort of People who riſe out of their Beds in the Night, and walk ſleeping; but this cannot properly be call'd a Diſeaſe, but rather a natural Action of Sleep mix'd with Waking, or Waking join'd with Sleeping: Thoſe who are ſubject to this Sleep by their external Senſes, are awake by the Strength of Imagination produc'd by the Action of the Spirits that are fix'd to a determinate Motion of Walking, Talking, *&c.* without knowing what or where.

The *Catalepſis* rarely happens, but it is a Diſeaſe wherein the Patient remains like a Statue, always in the ſame Poſture, if you puſh him forwards he ſtirs, and keeps the laſt Poſture that he gain'd by the Impulſion; they appear altogether aſleep, tho' in effect they ſleep not at all, neither do they move by any internal Impreſſion, but only by an external Impulſion like a Machine. In this Diſeaſe the animal Spirits are fixed and leſs apt for Motion, notwithſtanding which, they animate the Members of the Body, ſince they move where they are directed, yet keep their former Poſition, tho' without Knowledge. Amongſt all the Diſaffections, the *Lethargy* ought chiefly to be regarded, for the others depend ſometimes on external Cauſes, or proceed from a *Lethargy*, which is a principal Diſeaſe very frequent and dangerous.

The Cauſe of the *Lethargy* and all the ſleepy Indiſpoſitions, is the too-great Fixedneſs of the animal Spirits that render them incapable of the Actions and Expanſions, neceſſary to exerciſe the Functions of Senſe and

and Motion. The remote Cauſe of this, is the too great Aquoſity of the Spirits; namely, their being mix'd with too much Flegm, and not ſubtle or volatile enough, as it happens to Spirit of Wine ill rectified. In order to the Separation of the animal Spirits in the Brain, and their Purification from Flegm, the cortical Subſtance of the Brain is greaſy or oily, that it may not receive the leaſt Drop of Water into it, which is received in the Cavity made on Purpoſe for its Reception, call'd the Ventricles, and beſides there is an Infinity of Glands diſpers'd here and there to abſorb all the ſuperfluous *Serum*, and to diſcharge it otherways. All the cortical Subſtance, by which is made the Filtration or Diſtillation of the animal Spirit, is compos'd of ſmall Glands that ſuck up the abounding *Lympha*, and render the animal Spirit more volatile. But if it happen that the Brain is too moiſt or water'd beyond Nature by the *Lympha* that is brought thither too plentifully, or that it is ſtop'd in the Ventricles, and conſequently in the cortical Subſtance, the volatile animal Spirits are render'd impure, dull and heavy, by the Mixture of the Flegm, and as it is leſs apt to Motion, it muſt neceſſarily produce Reſt or Sleep. On the other Hand again, the Brain too much moiſtned, and its Pores too full of *Lympha*, hinders the Expanſion of the Spirits, their Influence and their Diſtribution into the proper Organs, from whence follows lethargick Symptoms, which is confirm'd by *Willis*, who aſſures us he always found the *Ventricles* of the Brain full of too much *Serum* in thoſe who died of any ſleepy Diſpoſition. The Ventricles could not have been effectually full, but that the *Serum* could not flow into the Brain: For this Reaſon, a *Hydrocephalus* is often ſucceeded by a *Lethargy*, and we may obſerve a *Lethargy* in an Infant, occaſion'd by a *Hydrocephalus*. Infants likewiſe are naturally inclin'd to ſleep, becauſe their Brain is too fluid, too ſoft and moiſt, and the animal Spirits on the other Hand too unactive, and not fine enough. In Catarrhs and Headachs *Lympha* abounds, becauſe the Glands do not filtre, the Brain is uſually moiſt, and we have great Inclination to ſleeping; it is for this Reaſon that lethargick People have pale Countenances, and bloated with the Eyes ſwell'd or puff'd up.

The Signs of ſleepy Affections are pretty plain, and ſerve to diſtinguiſh the *Lethargy* from other Indiſpoſitions, for it is attended with a ſlow continued Fever, that is briſker in the Night; the Heat is acid and biting, the Stools are thin, and the Urine muddy, the Pulſe is irregular, the Face pale, and the Eye ſwell'd: It is known from the *Carus*, in that there is no Fever accompanies the latter, and from the *Catalepſis*, becauſe the Sick does not continue his Limbs in one ſettled Poſture, as in that Diſeaſe.

The *Lethargy* is an acute Diſeaſe that kills in Seven Days, except the morbifick Matter is evacuated naturally and by a *Criſis*, or artificially by Stool, or that the *Parotids* appear not the Day of the *Criſis*, or that the ſame Matter is not diſcharg'd by the Noſe, *&c.* When the Fever and other Symptoms abate, there is hopes of Health; when on the contrary the Symptoms encreaſe, and cold Sweats come, eſpecially upon the Head, it is a Sign of Death; the Trembling that comes upon a *Lethargy* is a mortal Sign. A *Lethargy* ſuceeeding a *Frenzy* is mortal, and the *Frenzy* that ſucceeds the *Lethargy* is ſalutary.

The *Vertigo* or a Turning in the Brain, is an Appearance to the Imagination, as if every Thing turn'd round with us; there are Three Sorts of it, or rather Three Degrees; the Firſt is, when the Body only and the external Objects ſeem to turn, and that ceaſes preſently which makes the ſimple *Vertigo*. The Second is, when the Eyes appear as if darkned by a Cloud, ſo that the Sight is loſt, and that they look to be ſeveral Colours, as Yellow, Green, Blue, *&c.* before the Darkneſs fell upon the Eyes. The Third Degree is, when the Darkneſs is ſo great that the Patient cannot ſupport himſelf from falling, and this comes near to the Falling-Sickneſs or Epilepſy.

It was vulgarly believ'd, that the Cauſe of the *Vertigo* was a Turning of the animal Spirits in the Brain, which is falſe; for it is in the Eye, according to *Etmuller*, ſince it is the Sight that repreſents the Objects turning round. The Indiſpoſition muſt then neceſſarily reſt in the Organ of Sight, and not in the Brain. If it is objected, that

the Sight is made in the common Senſe; not in the Eye which ſees nothing, and that the Turning of the Spirits in the common Senſe forms the *Vertigo*. It is anſwer'd, That the Truth of the Appearance, or the Repreſentation of Turning, is made the common Senſe, but it is falſe that there is any actual Turning in the *Vertigo* to be met withal. If one ſtir a Looking-glaſs, it looks as if all the Objects ſtirr'd, and if you turn it round, the Objects ſeem to turn in the ſame Manner. If there happen ſuch a Turning in the Eye behind the aqueous Humour in that next the *Retina*, is it any way ſurprizing that a *Vertigo* ſhould enſue?

The Cauſe of the *Vertigo* is from an irregular Motion of the animal Spirits in the Eye, which is determined from a round Concave from a circular Motion. This irregular Agitation is made equal in the other Organs, from whence follows a Tingling of the Ears, *&c.* When the Motion of the viſual Spirits, and the Humours of the Eye is too rapid and confus'd, the Sight is ſo diſturb'd, that the Eyes are obſcur'd and cover'd with Darkneſs, which is a Symptom of the Sight being loſt: When the irregular Motion of the Animal Spirits is continued to the Muſcles, they undergo ſlight Convulſions, as they do from the Aſſaults of the Epilepſy; which makes it evident, that the viſual Spirits only are not diſorder'd immediately in the Eye, but all the Syſtem of the Nerves are affected from the Animal Spirits in the Brain. In a Word, that the Organs of other Senſes are afflicted, as the Giration or Turning of the Spirits is more ſenſible in the Eye than in other Parts: This diſorder then is call'd *Vertigo*, from its principal Symptom.

A violent continued *Vertigo*, without any external manifeſt Cauſe, threatens young People with the *Epilepſy*, and old ones infallibly with an *Apoplexy*. The *Vertigo* is more dangerous and difficult to cure in advanced Years than in Youth: In a Word, the *Vertigo* is dangerous, according to the Degrees of it. It is free from Danger when nothing but the external Objects ſeem to turn, but when the Head and the Body turn with the external Objects, there is more to be fear'd; but the moſt dreadful Degree is the *Scotomia* and the *Falling-Sickneſs*.

All the Motion of the Body is perform'd by Means of Fibres, which are like Cords to move the Parts backwards or forwards, and theſe Fibres are mov'd by the Animal Spirits ſupply'd or ſeconded from the Blood; ſo that theſe Fibres join'd together into a Bundle, is what we call a Muſcle, or wove into a circular Texture or other Figure, is a Membrane, ſuch as appears in the Inteſtines, *&c.* In the End, all theſe fibrous Parts receive their Senſation from the *Cerebrum* and *Cerebellum*, the Firſt of which makes a voluntary Motion, and the laſt an involuntary Motion, which ſome improperly call a natural Motion, ſince both are equally Natural, when the Muſcles cannot move but according to the Command of the Will, or when the involuntary Motion is continued from the Fibres quietly in the interior Parts, and without Pain; but the Muſcles moving themſelves without waiting for the Command and with conſiderable Pain, if the external or internal Parts contract themſelves violently. They call this Diſeaſe a *Convulſion*, which is of Two Sorts, the *Retraction*, and the ſudden Twitch or Shake; by the Retraction, is meant the Convulſion; and by the laſt, the convulſive Motion; the Firſt is a Tonick Convulſion, and the other a Clonick one.

There are Three conſiderable Kinds of the Tonick Convulſion, which are the *Tetanos*, the *Emproſtotonos* and the *Opiſtotonos*; to which we may add ſeveral others, as the *Priapiſm*, and the *Satyriaſis*, the Canine Convulſion, and a convulſive Laughter with the Stiffneſs of the Arm, occaſion'd by pricking of a Nerve in Blood-letting; in ſhort, this is without a Name, wherein the Knees are contracted from a Nerve, and a Tendon that paſs under the Hollow of the Knee. As to the Three Firſt, the *Emproſtotonos* is a Convulſion of the maſtoide Muſcles that tie down the Chin to the Breaſt. The *Opiſtotonos* on the contrary, is the Contraction of the Muſcles of the *Occiput* that incline or bind down the Head backwards: In ſhort, the *Tetanos* is a Convulſion of the anterior and poſterior Muſcles of the Head, which keep it ſtiff and motionleſs, without inclining to one Side or the other.

The Clonick Convulſion or convulſive Motion, is when one or ſeveral Members

are unequally mov'd, as in the Epilepſy: Or we might mention the little Twitchings or Agitations that happen in Emiſſion of Seed, as ſeveral Philoſophers and Phyſicians agree, eſpecially *Democritus*, who calls Coition a gentle or ſmall Epilepſy. There is the *Cramp* or windy Convulſion, to which Drunkards and gouty People are ſubject; but the principal Kind of *Clonick Convulſion*, is the *Epilepſy*, which is directly a convulſive Motion, in which the Members of the Body ſuffer various Contractions, Vibrations and Agitations.

There are Three Degrees or Kinds of it: The Firſt, falſly attributed to the *Epilepſy*, is when the Sick fall ſuddenly on the Ground, remain there, are preſently depriv'd of all Senſe, and lie as it were in a deep Sleep, as to the Animal Actions, without any ſenſible Convulſion of the external Parts, tho' internally the nervous Parts are affected, eſpecially if the Diſorder happen by Conſent of the *Viſcera* in the *Abdomen*, as in Hyſterick and Splenetick Caſes. The Firſt Degree of the *Epilepſy* is indeed the Third Degree of the *Vertigo*, call'd the Falling *Vertigo*, that reſembles much the *Epilepſy*, and is ſometimes follow'd by it. The Second Degree of the *Epilepſy*, is when the Body is ſhook by various Motions and Agitations, the Senſe and Reaſon remaining entire or not. The Afflicted dance, ſing, cry, make ridiculous Poſtures, and yet remember after the Fit is over whatever paſs'd during the Paroxiſm. The Third Degree is compos'd of the former Two, that is to ſay, of Senſe and Reaſon, and at the ſame Time of various Motions, Agitations and Shakings of the Body, grinding of the Teeth, their Hands clinch'd faſt, and a Trembling of the Feet, ſometimes throwing the Body up and ſometimes down, then contracting the Body crooked, frothing at the Mouth, biting of the Tongue, and ſometimes ſpitting it out in Pieces: All theſe Symptoms, and ſeveral others ceaſing gradually, the Patient remains extended as if aſleep.

The *Convulſion* and *Epilepſy* then are form'd from a deprav'd, violent and involuntary, and ſometimes painful Motion, and the Subject or Cauſe of the natural Motion, is equally the ſame of the Motion againſt Nature, and that Part which is effected; for Example, in the natural Contraction of the Arm, and in the voluntary Ejection of Stools, is equally ſo in the ſame Motions when they are againſt Nature: For as the nervous Fibres are the Subject of natural Motion in the humane Body, whether voluntary in the Muſcles, or involuntary in the internal Parts of the Body; for Example, in the Inteſtines; and as throughout where there is Motion there are Fibres, and where there are Fibres there is Motion, it muſt neceſſarily be that the ſame nervous Fibres are the proper Subject or Cauſe of morbifick Contractions in the *Convulſion* and the *Epilepſy*: We ſay the nervous Fibres, becauſe the Nerves are nothing elſe but a Maſs of Fibres rang'd variouſly one upon another, and cloath'd with a double Coat, which they receive from the *Meninges*, which makes the Body of the Nerve: Theſe ſame Fibres or the like, rang'd differently, compoſe a Muſcle, according as *Steno* has demonſtrated: From the like Fibres interwoven circularly, or from another Figure in the internal Parts, makes the inward and involuntary Motions.

We conclude, that the Fibres, and the Parts mov'd by the Fibres, are the Reaſon of the Fibres being ſubject to the *Convulſion* and the *Epilepſy*; whence we divide 'em into *Internal* and *External*. The External are thoſe which attack the external Members, as Convulſions of the Arm, the Head, the Eyes, the Thorax, *&c.* The Internal are ſuch as affect the internal membranous *Viſcera*, as in ſcorbutick convulſive Colicks, Hyſterick Paſſion, *&c.* where the Inteſtines, the Meſentery and the Parts adjoining, labour under ſpaſmodick Convulſions. It is this Diſeaſe that reigns when the Stomach from the Convulſion is irritated to vomit in Nephritick Pains, or when the Guts are afflicted with Gripings in the Nephritick Colick: It reigns alſo in the Palpitation of the Heart, which is a true Convulſion, and in the frequent Convulſions of the internal Parts of the *Hypocondria* in Scorbutick and Hyſterick Perſons, which are attended with ſeveral wandring Symptoms, particularly when the *Plexus* of the Meſentery are ſeiz'd; for as they ariſe from Nerves or other Parts of the *Abdomen*, they cannot be convuls'd but they muſt communicate to the whole Venter; beſides, as theſe *Plexus* are join'd to the

the Intercoſtals and the *Par Vagum*, Convulſions of the Breaſt and Head ſometimes follow, inſomuch, that the Convulſions of the internal Parts continue their Vibrations, even to the Brain, and cauſe irregular Motions to the whole Syſtem of the Nerves and Spirits, ending in ſhort in a Convulſion of the external Parts: For this Reaſon, the *Epilepſy*, which is a Convulſion of the external Parts, oftentimes ſucceeds Hyſterick Fits and difficult Labour, which Epilepſy attacks the Patient as often as ſhe endeavours to exclude the Birth. The ſame Pains in the *Abdomen* before and after Child-bearing, are no other than the Convulſions of the Parts of the Belly, eſpecially from the Womb, the Meſentery and the Inteſtines.

As to the Signs of the *Convulſion* and the *Epilepſy*, they are ſo evident, it would be needleſs to deſcribe them: But the Prognoſticks are theſe; the Convulſion by Conſent of Parts is leſs dangerous and eaſier to cure than the Eſſential one. The Convulſion that comes upon a Malignant Fever often denounces Death: If all the Body be free from the Convulſion, except that the Lips, the Eye-lid, or the Tongue be ſeiz'd, it is an ill Sign, and the Phyſician ought to fear Death, or an Epileptick Convulſion. The *Delirium* and the Convulſion, from a Hæmorrhage, are much to be dreaded. The Convulſion that ſucceeds a ſtrong purgative Doſe is uſually Mortal, and the Sick rarely eſcape: However, we ought not altogether to deſpair, for Opiates, the Treacles and other Alexipharmicks, oftentimes relieve. The Convulſion and violent Pains are dreadful in acute Fevers. The Convulſion and *Delirium* after waking much, are very dangerous. As to the Convulſion being join'd with the Fever, it is better that the Fever ſucceed the Convulſion, than the Convulſion the Fever; on the contrary, if the Fever ſucceed the Convulſion and a *Tetanos*, it terminates the Diſeaſe. In ſhort, all thoſe who are ſeiz'd with a *Tetanos* die in Four Days, if not, they eſcape.

The *Epilepſy* is incurable, or very rarely reliev'd; that which happens before the Age of Puberty, is curable; after Twenty, it uſually holds till Death. Epileptick Children are cured by the Change of Age, Place, or Regimen of Living: Manhood delivers young Boys from this Diſeaſe; and the Menſes, Girls. If the Sick ſneeze not upon taking ſneezing Powders in the Paroxyſm, it is an ill Sign, which ſhows that Nature is ready to yield and almoſt ſunk. Thoſe who have a Quartan Fever, are not ſo ſubject to Convulſions: If Convulſions proceed, the the Quartan Fever that follows, cures them.

The Trembling or Shivering of the Limbs is an Affection or Diſpoſition join'd to the natural and voluntary Motion, and ſomething that is Convulſive, as when one would lift up a Limb, it falls and inclines to the contrary, reſiſting the voluntary Motion. The Trembling is greater or leſs, according to the Degrees of it, and is Simple or Convulſive: The Simple is a ſmall Shaking, ſuch as that which ſucceeds Drinking, or Paſſion, and particularly Anger: The Convulſive is a ſtrong Trembling, like that which happens ſometimes in the going off of Epileptick Paroxyſms, and which ceaſes with the Fit: Thoſe who have this Diſeaſe cannot ſtir their Limbs freely, either in extending or ſhortning them; the Cauſe of this is not a Conflict betwixt the Weakneſs of the moving Faculty and the Weight of the Limb, as is uſually ſaid, but is perform'd by the conjoint and deprav'd Action of the Two Antagoniſt Muſcles.

There are properly Two Actions, the one whereof is principal and voluntary, the other inferior and contrary to Nature; ſo that at the ſame Time that one Muſcle extends the Arm, the other draws it back, or makes it move defectively ſome other Way, whence follows the Trembling or Shaking. The Cauſes of this double Action of the Muſcles contrary to Nature, are the ſame with the natural Motion, to wit, the Animal Spirits by their natural Influences perform the natural Motion, and the deprav'd Influences the defective Motion. The Fault or Vice of the Animal Spirits conſiſts in this, That they are brought too readily and plentifully into one Muſcle than into another, diſtributing themſelves equally at the ſame Time into Two diſtinct Muſcles, which produces an irregular Motion, either thro' the proper Defect of the Spirits, or the Part that received them: The proper defect of the Spirits, is when they hurried on confuſedly and thrown into violent Paſſions, as

Fear, Love, Anger, *&c.* or that they are render'd too fix'd by ſome narcotick Quality, and ſo are carried irregularly into the Nerves; 'tis for this Reaſon, that after an Exceſs of ſtrong Wine, and the Abuſe of Narcoticks, as *Opium*, *&c.* the Limbs are ſubject to tremble: This Trembling happens thro' the Defect of the Part, when the Nerve that ſhould carry the Spirits to the Muſcle where they ought to be carry'd, has its Pores ill diſpos'd, or the Fibres are rang'd amiſs, or ſome Pipes are ſhut up or obſtructed, ſo that the Motion of the Spirits is deprav'd, which are thrown at the ſame Time into the Muſcle appointed for its requiſite Motion, and that of the neighbouring Muſcle; the frequent handling of *Mercury*, the too great Coldneſs or Chilneſs of the Part, cold Waters drunk too plentifully in Burning-Fevers, and the Suppreſſion of the *Menſtrua* and *Lochia* likewiſe occaſion Trembling.

A Trembling or Shaking is evident to the naked Eye, and need no Deſcription, but the Prognoſticks are theſe: A Shaking that ſucceeds a *Paralyſis* is not an ill Sign, but a good one, that the *Palſey* is going off, and the natural Motion returning trembling from an internal Cauſe, is not dangerous in it ſelf, but as it degenerates into more grievous Diſeaſes, as the Palſey, Apoplexy, Lethargy, Convulſion, *&c.* when it is not to be neglected. The Trembling in old Age is almoſt incurable, and ſeldom leaves them till Death. An Hereditary Trembling, or ſuch as comes by Degrees from a vitiated Habit of Living, can never be perfectly cur'd: If the Trembling changes into a Convulſion, it is an ill Sign; ſo likewiſe if the *Delirium* ſucceed a Trembling in Burning Fevers, by the moving of the morbifick Matter. The Trembling that ſucceeds in an Apoplexy or Lethargy, is a dreadful Accident that foretels the Weakneſs of the Animal Life and its Functions: The Trembling, or rather the convulſive Motion of the lower Lip, betokens Vomiting.

The *Apoplexy*, according to *Etmuller*, is when all the Animal Functions that conſiſt in the Motion and Senſation of Life, ceaſe all at once; ſo that the Patient ſeems as if he were ſtruck with a Thunder-ſtroke, remaining without Senſe or Motion, with more or leſs Loſs of Reſpiration, according to the Strength of the Fit, with or without rattling in the Throat, and the Beating of the Pulſe; which, if but ſlenderly felt, ſhows the Danger is not ſo great. There are Three Kind of Apoplexies aſſign'd: The Firſt is the *Hemiplexia*, which is an Indiſpoſition of one Half of the Body, when the Patient is either entirely ſeiz'd on the Right or Left Side, from the *Sagittal Suture* to the *Perinæum*. The Second Sort is the *Apoplexy* without Name, which is, when all the Body is depriv'd of Senſe and Motion, except the Head, all the reſt, Neck, Hands, Feet, *&c.* being affected, during which Time, the Tongue ſpeaks, and the Ears hear; this Kind of *Apoplexy* is rare, but met with ſometimes. The Third Sort is the *Paraplegia*, which ſeizes one or two Limbs, greater or ſmaller, wherein all Senſe and Motion are intirely loſt.

The violent *Apoplexy*, whereof *Hippocrates* ſpeaks, is that of all the Body, which no Perſon can cure without a *Fever*; and the ſlight *Apoplexy* comprehends the Three laſt Kinds, to wit, *Hemiplexia*, the *Apoplexy* without Name, and the *Paraplegia*, which are ſlight in reſpect of the univerſal *Apoplexy*; for we may ſee that the Sick labouring under any of theſe Three Kinds, ſurvive a long Time, whereas the Apoplectick and Paralitick are hard to cure.

The immediate or proximate Cauſe of the Abolition of Senſe and Motion throughout the Body, or in ſome Part, and the ſudden Ceſſation of all the Animal Actions, is the Ceſſation of the equal and natural Motion of the Animal Spirits in the Brain, and in the Organs of Senſe and Motion whereon the Animal Functions depend: The Ceſſation of Motion from the Animal Spirits happens, either becauſe the Pores in the Brain are defective, and the Paſſage of the Spirits ſtop'd, or becauſe the circular Motion of the Blood in the Brain is interrupted, from whence follows the Ceſſation of Motion from the Animal Spirits, which are generated from the Blood in the Brain.

The Cauſes that hinder the Blood from mounting to the Brain, conſiſt either in the Veſſels or the Blood. The Firſt oppoſe the Motion of the Humours, when they either grow ſtraiter, or are ſtop'd by ſome Obſtruction, Contuſion, or any other Way, or when the Veſſels are lacerated or broke in the

the Head, ſo that they open their Mouth, and let the Blood contrary to Nature into the Brain: The Cauſe remains in the Blood when it is thick, ſizy, and almoſt coagulated, ſo that it ſtops either in the ſmall Veſſels of the *Meninges*, or in the *Sinus* of the Brain, or in the Branches of the *Carotids* and the Jugulars, or, in ſhort, in thoſe of the Lungs, for the Blood ſtopping in the latter, forms a *Cardiack Syncope*, or a ſuffocating *Catarrh*. Diſeaſes that have a near Reſemblance and Affinity to the Apoplexy, and which differ not but in the Situation: Both killing the Patient after the ſame Manner.

The remote or foreign Cauſes of the *Apoplexy*, are Contuſions or Concuſſions of the Head, which ſink the Brain and ſtraiten the Pores, raze out the Track of the Spirits, leſſen the uſual Evacuations of Blood by the *Hæmorrhoides*, Womb, or Noſe, which cauſe an Extravaſation of Blood by their Breaking in the Brain, and in the adjacent Parts, from violent Paſſion, eſpecially Anger, for in raiſing an extraordinary Ebullition in the Blood, the Extravaſation is eaſily excited; in ſhort, the Narcotick Fumes of Charcoal and Wine fix the Animal Spirits, and make Way for a Coagulation of the Blood.

The *Apoplexy* is divided into an *Apoplexy* proceeding from the Blood, and an *Apoplexy* from *Serum* or *Lympha*. The *Apoplexy* from the Blood is proper to Men in the Prime of their Years, who are inclinable to Paſſion and Drinking. The *Apoplexy* from *Serum*, old Men that are decrepid, *Catarrhous*, *&c.* are moſt ſubject to, and ſuch as are of a pituitous and flegmatick Conſtitution. The Signs of the *Apoplexy* are too evident, as hath been deſcribed, to ſay any more of them.

We may diſtinguiſh the *Apoplexy* with the cardiack *Syncope* or the ſuffocating *Catarrh*, in that this is attended with great Difficulty of Breathing, and Uneaſineſs from the Breaſt, and that in a violent *Apoplexy* the Patient has ſcarce any Signs of Life at all, without a great deal of Trouble in Reſpiration. We diſtinguiſh the *Apoplexy* with the *Hyſterick Paſſion*, in that this is preceded by Symptoms in the *Abdomen*, that the Senſes remain, that Reſpiration is not ſo eaſily obſtructed, that the Pulſe is dull, weak, or ſmall; in ſhort, that the Viſage is pale and without Colour, which ſometimes is ſo in the *Apoplexy*. The *Carus* is diſtinguiſh'd, in that it ſeizes by little and little; the Sick breathe eaſily without Ratling in the Throat; beſides, they do not Sleep ſo profoundly.

The *Apoplexy* is a very acute and dangerous Diſeaſe: Thoſe, ſays *Hippocrates*, who are taken ſuddenly with Loſs of Speech, *&c.* die in Seven Days, in leſs if the Fever do not ſucceed: It is impoſſible to cure a ſtrong *Apoplexy*, and difficult to cure that which is ſlight. The Danger of the *Apoplexy* is meaſured by the Reſpiration; becauſe almoſt all *Apoplectick* Patients die ſuffocated: The freer the Breathing is, the ſlighter is the *Apoplexy*, and the more Hopes there is; on the contrary, the leſs free the Breathing is, there is the more to be fear'd. If the Reſpiration is ſo much obſtructed that the Patient froths at the Mouth, it is uſually a mortal Sign; for this Froth is an infallible Token, that the Circulation of the Blood is interrupted in the Lungs, which ſtops equally in the Heart, ſo that this Froth is thrown out as the laſt Effort of Life; which made *Hippocrates* ſay, that Perſons ſtrangled or choak'd, and not yet dead, would not recover, if the Froth appears at the Mouth. We ought nevertheleſs to take Care, leſt we confound the true Froth with the Liquor or *Viſcid Saliva* that flows; for it happens as well in the ſuffocating *Catarrh* as in the *Apoplexy*, that the Sick throw out abundance of viſcid Liquor by the Mouth, that proceeds from the pituitary Glands, and has no Analogy or Relation to the Froth that comes in a ſmall Quantity only from the very Bottom of the Lungs. We may likewiſe ſee Apoplectick Bodies that have this Froth working out of the Noſe and Mouth after Death; and it is a Sign of Death in the *Apoplexy* when Sweat ſucceeds a Difficulty of Breathing, for the Sweat is then ſymptomatick and not natural. We ought chiefly to have regard to Age and Conſtitution, for there is a great deal of Difference betwixt the *Apoplexy* that ſeizes a young Man or one in the Vigour of Age, and an *Apoplexy* that attends an old Man that is feeble and emaciated. The *Apoplexy* is overcome when it can be carry'd off entirely by Stool or Sweats, and when it degenerates into a *Paraplegia* or a *Hemiplegia*, or by a Flux at the Mouth like a Sali-

a Salivation; ſometimes Apoplexies are carry'd off by a Kind of deep Sleep.

The *Paraplegia* is a ſymptomatick Diſeaſe, or a particular *Apoplexy*, and has the ſame radical Identity with the *Apoplexy* and the *Epilepſy*, ſo that it changes ſometimes into one and ſometimes into the other, ſomething of the ſame Kind may be obſerv'd from the Convulſion, as well in the *Apoplexy* as the *Epilepſy*; there are Three Degrees of the *Paraplegia*, in the Firſt the Motion only ceaſes, and the Senſe remains; in the Second, the Senſe and Motion are both loſt, and the Heat partly continues; in the Third, the Motion, the Senſe and the Heat of the Part are aboliſh'd with a *Maraſmus* or *Atrophia*; the *Paraplegia* is eaſily cured, the Firſt Degree is ſlighteſt and eaſieſt of Cure; the laſt more difficult and obſtinate: If a Trembling or Pain comes upon the Parts, it is a good Sign of Recovery, but the leſs Heat the paralytick Member perceives, the leſs Hopes there is.

The *Paralyſis* or Palſey, according to *Etmuller*, is properly an *Atonia* or Loſs of the Spring of the nervous Fibres and Muſcles, eſpecially in the Tendons and Ligaments, which being relax'd, become incapable of drawing or contracting, and giving ſufficient Strength to the Limbs. The Palſey with Loſs of Motion without Loſs of Senſe, is the Slighter, and is call'd *Pareſis*, as in the Colick and the Scurvy: When Motion and Senſe are loſt at the ſame Time, it is a very ſtrong *Paralyſis*.

The *Paraplegia* and *Paralyſis*, differ Firſt as to their Origine: The *Paraplegia* ſucceeds particularly Diſeaſes of the Brain and Spine, and very commonly the Epileptick Apoplexy, Convulſions, *&c.* The *Paralyſis* on the contrary, follows the Diſeaſes of the Body, or depend on ſome external Cauſes; it particularly accompanies the Scurvy or the Colick in thoſe Countries where they drink a great deal of Wine. Secondly, they are different as to their Subject; for they are the Nerves that are ſeiz'd in the *Paraplegia*, and the Joints in the *Paralyſis*: For this Reaſon, the Topicks ought to be differently apply'd in theſe Two Diſtempers. Thirdly, they are different as to their Symptoms in the true *Paraplegia*, the Senſe of Touching, and the Motion only is loſt ſometimes, or leſſen'd with a very painful Senſation; we might add a Fourth Circumſtance, to wit, that the true Reſolution of the Nerves or the *Paraplegia*, that remains almoſt always in the ſame State from the Beginning to the End; it is in ſome manner perpetual, and Mocks the Phyſician's Endeavours, being very difficult to Cure, eſpecially when it ſucceeds an *Apoplexy*. The *Paralyſis* and the *Pareſis* on the contrary, attack the Sick by Intervals of a greater or leſſer Space: They ceaſe and return, and are ſometimes complicated with the Gout; they degenerate ſometimes into a Convulſion, and give no Title to the moſt experienc'd Phyſicians.

We obſerve that in the true *Paralyſis*, the Senſe remains, and the Motion only is loſt, but rarely the Senſe at the ſame Time; on the contrary, both Senſe and Motion periſh at the ſame Time in the *Paraplegia*, and rarely the Senſe without the Motion. Old People and Children are as it were half *Paralytick*; Infants are ſo, becauſe their Fibres and Tendons are water'd with too much nutritious Juice, they are lax and weak, and conſequently too feeble to ſtir their Limbs and ſupport the Weight of their Bodies: Old People on the other Hand are deſtitute of nutritious Juice, but in their ſtead are fill'd with a watry *Serum* that relaxes at once the Fibres and the Tendons.

The Signs of the Palſey are too manifeſt to want a Deſcription, but that and the *Pareſis* are eaſy to cure, tho' the *Paraplegia* be very difficult: The Palſey with the Loſs only of Motion, is out of Danger and eaſy to be reliev'd. The *Paralyſis*, with a ſtrong and ſudden Luxation of the *Vertebræ* of the Back, eſpecially the Neck, is uſually Mortal. The more the Heat of the Parts are extinct, the leſs Hopes there is; but if a Trembling ſeize them, 'tis a good Sign, but the Palſey in Age is almoſt always incurable: A Fever that ſucceeds either an *Apoplexy*, *Palſey*, or *Paraplegia*, and other the like Diſaffections of the Nerves is very ſalutary, and often puts an end to the Diſeaſe.

The *Stupor* is an imperfect *Paralyſis*, in which Motion and Senſe are nothing but benumm'd; it is occaſion'd by a watry *Lympha* that moiſtens and waſhes too much the Brain, and we obſerve that when it is accompanied with a Fever, it foretels ſome co-

matous Sleepineſs or future Lethargy, and when it happens only without a Fever, we may take the Danger to be a Palſey or an Apoplexy.

Mr. *Duncan* obſerves, that when the *Rout* by which the Animal Spirits ought to paſs, is partly ſhut up, or preſs'd from without, there happens a Numneſs in the Parts thro' which they ought to be convey'd, becauſe that the ſmall Stream of that inviſible Matter that cannot paſs but with Trouble, muſt needs make very ſmall Undulations, which may not be brought to the hollow Bodies, or ſcarcely perceiv'd and felt by the Organs of Senſe by reaſon of their Minuteneſs. He adds, that Experience has convinc'd the World that the Numneſs of a Part is caus'd by the preſſing upon a Nerve, that hinders the flowing of the Spirits; for there is no Body but what has try'd this, by lying too long upon one Thigh, or leaning upon the Elbow; but there are few People who ſearch into the Cauſe why this Numneſs is follow'd by a troubleſome pricking Pain.

We call a *Delirium* a Deprivation or Wandring of Reaſon, which happens in all the three Operations of the Soul: Firſt, In the Apprehenſion of the ſimple Objects and ſimple Conceptions; for Example, when the Patient takes one Thing or one Perſon for another. In the ſecond and third Place, in the Compoſition and Diviſion of ſimple Conceptions, and in the Concluſion and Diſcourſe; ſo the Patient imagining that he is made of Butter, will not come near the Fire for fear of being melted. *Deliriums* are different, ſometimes ridiculous, ſometimes ſerious, ſometimes without Order or Foundation.

The Cauſe of the *Delirium* in general is in the Animal Spirits, which being variouſly hurt, occaſions different Sorts of *Deliriums*, which I ſhall explain by Example: Six Perſons that are drunk by one and the ſame Wine, it ſhall have different Effects on every one of them. One is furious, another amorous, a third ſings, a fourth ſleeps, a fifth fancies himſelf the richeſt, and a ſixth, the wiſeſt Man in the World; and this proceeds from their different Conſtitutions, and the natural Diverſity that is in the Texture of the Blood and Animal Spirits to produce theſe various Actions from one and the ſame Cauſe.

All theſe *Deliriums* proceed from external as well as internal Cauſes, as the taking of Hemlock, Henbane, *Opium*, *Nux Vomica*, the Biting of a mad Dog, *Tarantula*, and the Philters, that determine the Motion of the Animal Spirits, and give Occaſion to the Soul to frame various foreign Conceptions, from whence the *Delirium* follows.

The *Delirium* that depends on an internal Cauſe, is either without a Fever or with a Fever, and that ſubdivided again into a ſlight or violent one. The ſlight *Delirium* is call'd the *Paraphreneſis*, and the violent one the *Phreneſis* or Phrenzy, namely, that which is believ'd depends on the Inflammation of the Membranes of the Brain. The immediate Cauſe of the ſlight and violent Phrenzy is the various and confus'd Motion of the Animal Spirits in the Brain, by Means of which the Soul frames different Fancies, by talking wildly and without Order, by Laughing or Crying, ridiculous Geſtures, *&c.* according to the Impetuoſity and Swiftneſs of the Animal Spirits; in the End, ſometimes Convulſions happen that are mortal. When the Spirits are almoſt exhauſted, or too much fix'd by the immoderate Uſe of Narcoticks, the Diſeaſe terminates in a Lethargy, or rather in a *Carus*.

The remote Cauſe of this Agitation of the Spirits in the Brain, is the too great Heat of that Part, occaſion'd by the extraordinary Effervеſcence of the Blood. The Spirits are render'd too ſubtle and petulant by this Heat, moving themſelves in the Brain with too much Swiftneſs, and at the ſame Time with too much Confuſion, from whence ariſes firſt of all obſtinate Wakings, then the Phrenzy, and at laſt Convulſions. For this Reaſon the *Delirium* comes particularly in the Increaſe of the Continued Fever, or at leaſt in the Beginning of a Burning Fever, becauſe then the Effervеſcence of the Blood is in much greater Violence, and the obſtinate Wakings, with a ſlight *Delirium*, manifeſt themſelves in the Beginning of the Fever. As for the Phrenzy, it is ſometimes join'd to an Inflammation of the Brain, ſometimes to an Inflammation of the Membranes, or otherwiſe with an Inflammation of the Cortical Part of the Brain; and theſe two laſt Inflammations are met with, when the Phrenzy comes from a Removal of the morbifick

bifick Matter, that is to ſay, when after an external *Eryſipelas*, after a *Pleuriſy*, *Peripneumonia* or *Quinſey*, are ſuddenly cured, a *Phrenzy* ſucceeds. This is a Sign that the Blood coagulated in the Inflammation of the Parts, and ſtops in the Membranes of the Brain, or in the Brain it ſelf, where it forms a new Inflammation.

Youth, the Heat of Summer, and the Cuſtom of drinking generous and ſpirituous Liquors, eſpecially Wine, diſpoſe the Body to Phrenzies, to which hard Drinkers are ſubject. Strong Paſſions, as Anger, *&c.* make Way for Fevers and a Phrenzy. Anger is a Kind of ſmall Fever, in which the Blood boils in the Breaſt, the Body burns, the Face is fiery red, the Pulſe frequent and large, by which the Fermentation of the Blood is increas'd, ſo that the Fever and Phrenzy will follow.

We may know if it be an Inflammation of the Diaphragm, or of the Brain and its Membranes, or only a ſimple Incaleſcence or Heat in the Parts and the Spirits, by the following Signs; namely, by the prodigious Pain, if it be an Inflammation of the Brain; for from the Nature of the Part we can tell that the Pain is extreme, ſince the *Dura Mater* of the Brain is affected, which is a very ſenſible Part: Therefore thoſe who have the Phrenzy, are us'd to tear their Hair, without knowing that the inſupportable Pain occaſion'd it. They always lift their Hands to their Head, and will give it furious Pulls. As the Pain is violent in the Inflammation of the Brain and its Membranes, the Diſeaſe is very ſhort, not being able to laſt after the Diſſipation of the Spirits. Beſides, Convulſions ſometimes ſucceed when the Inflammation begins to degenerate into a Gangrene, which is the End of all Inflammations: Then there is a very violent Pulſation, which may be diſcover'd by looking upon the Neck, where the Carotid Arteries beat with great Impetuoſity, occaſion'd by the Blood thrown into them, and from that which is ſtop'd in the Brain by the Inflammation.

The Phrenzy is a very dangerous and acute Diſeaſe, and the more ſo when the Membranes of the Brain are inflam'd, than when the Inflammation lies in the Spirits or Blood. When the Strength of the Body is impair'd in the Phrenzy, the Sick generally die. If it ſucceed Convulſions, the Loſs of Speech, Hiccup, Grinding of the Teeth, Faultring or Trembling of the Voice, involuntary Ejection of Siege or Urine, are dreadful Signs the Phrenzy is mortal. That which degenerates into a Lethargy, or Comatous Diſpoſition, is the ſame.

Sometimes the moſt furious Phrenetick Patients become all of a ſudden quiet, keep a profound Silence, and ſeem as if they would ſleep, which nevertheleſs may deceive the Phyſician; for if otherwiſe the Strength does not appear increas'd, or if no other good Sign or *Criſis* is to be met with, it is a manifeſt Token that the ſaid Tranquility is falſe, and proceeds from nothing but the Removal of the Matter which is in the Membranes into the Subſtance of the Brain, ſo that the Patient is far from being reliev'd, but is in very great Danger. As the *Delirium* in the *Phrenetick* and *Paraphrenetick* Fever is ſometimes Critical, it is of Importance to know how to diſtinguiſh it from the Symptomatick, to which the Phyſicians ought to preſcribe, but not to meddle with the Critical *Delirium*. The Signs of the Critical and Salutary *Delirium*, which is ordinarily ſucceeded by an *Hæmorrhage*, are the following; to wit, the Signs of Concoction in the Urine, the Unevenneſs of the Pulſe, the Brightneſs of the Eyes, the Redneſs of the Face, the ſoft Diſtention or Yielding of the *Hypochondria*, the Youth and Uſe of the Patient to bleed at the Noſe.

The Melancholy *Delirium* is without a Fever, and ought to be diſtinguiſh'd from a ſimple Melancholy, by which we mean the Humour of a Man that is found to be a little Chagrin, that is eaſily vex'd without Occaſion, and whom nothing pleaſes, but is ſad and penſive, and who frights and diſturbs himſelf without any Reaſon; in ſhort, who is not Maſter of his Reaſon and his Thoughts. A *Delirium* coming upon this, is properly what we call a Melancholy *Delirium*, which is a Diſeaſe complicated with the *Melancholy* and *Delirium*, that are two different Things. We may find by Experience upon our ſelves at different Times an Alteration, wherein we feel a Weight and Diſturbance, which is a natural Melancholy Diſpoſition, and which may come conſequently to be morbifick, and be attended

with a *Delirium*, that obtains different Names according to the Imagination or Fancy, and the different Symptoms of the Melancholy Perſons.

A Melancholy without a *Delirium* is call'd a Trouble of Mind, and this Trouble or Diſorder happens ſometimes without any Account in Reaſon, and is not always join'd with Sadneſs and Chagrin, as ſome will have it, but is attended with ridiculous Whims, where the Patient is gay and merry to Extravagance; but this is not uſually call'd Melancholy, becauſe 'tis believ'd that Diſtemper proceeds from the Humour of the Body call'd Melancholick. All the Thoughts of theſe Sort of Men are more fix'd upon a ſingle Subject, not but ſeveral Objects ſucceed one another, which makes the Diverſity of Humour in them; but ſtill their Thoughts are more intent upon one particular Thing. They are always uneaſy and diſquieted, and are laughing and crying in the ſame Breath. They have plain Intervals ſometimes, wherein their Reaſon ſeems to be entirely reſtor'd; but in an Inſtant ſometimes they are alter'd, and the Fit returns upon them.

Mania or Madneſs is a *Delirium* without a Fever, with Fury, Boldneſs, and total Loſs of Reaſon, in which the Sick throw themſelves upon every Thing that is preſent, break all before them, treat injuriouſly all Perſons they meet withal, and whom we are obliged to chain and keep under cloſe Confinement. The Fury that makes all Madmen daring and enterprizing, is worthy a particular Conſideration; wherein we may obſerve, that their Boldneſs or Deſperateneſs proceeds from nothing but an inward Suſpicion and Fear; for when they ſee any Body that are afraid of them, they throw themſelves inſtantly upon them, and fly from thoſe who are bold, and when they are beat, they are frighted and fall upon their Knees. The Deſperateneſs, or rather the Temerity, of Madmen, is attended with an incredible and ſurprizing Force. They will break great Chains, and bite aſunder almoſt whatever comes near them; and what is very remarkable in them, is their Hardineſs to endure the moſt pinching Cold. They will uſually tear off their Clothes, and remain naked upon the Ice, without ever receiving any Damage or Chillineſs. Madneſs differs nothing in its Original from other Kinds of Melancholy *Deliriums*, ſince we frequently ſee Madneſs degenerate into Melancholy, at other times a ſad and heavy Melancholy turn into Madneſs. Madneſs is then a Kind of Melancholy join'd with extravagant Rage or Fury, as we ſee Melancholy join'd with Sadneſs, ſometimes with Laughter, at other times with Love, Anger or Fury. If we conſider a Man ſound in Body and Mind, hurried nevertheleſs by an Exceſs of Paſſion, or rather a drunken Man enrag'd, as it is cuſtomary for thoſe Sort of Men to be, and nicely examine the Actions of ſuch, we ſhall find it to be a Kind of natural Madneſs.

The remote Cauſes are almoſt the ſame with thoſe of other Melancholy Diſpoſitions; nevertheleſs there are certain Poiſons which have a ſingular Power to produce *Madneſs*; as the Root of Deadly Nightſhade infus'd in Wine, will cauſe ſuch a *Delirium* as ſhall make the Sick throw themſelves out at the Window; and the Seed of Black Henbane taken in a certain Doſe, cauſes a quarrelſome and outragious Madneſs. The Philters or Love Potions are often the Cauſes of powerful Madneſſes, eſpecially thoſe which have been prepar'd with the *Menſtrua* of Women; and *Borellus* relates, that a Divine having eat of a *Ragoo* that was made with Menſtrual Blood mix'd with the Blood of a Hare, fell into ſo great a Madneſs, that he kill'd his own Father. In ſhort, the Suppreſſion of uſual Evacuations of Blood, as the *Hæmorrhoides* or *Menſtrua*, the *Varices*, or improperly ſtopping old Ulcers, likewiſe produce Madneſs. As Madneſs has ſome Affinity with the Phrenzy and *Dæmoniacks* or People poſſeſs'd with a Devil, it is of Importance to know how to diſtinguiſh theſe Diſaffections. It differs from the Phrenzy, becauſe Madneſs is without Fever, and without any Sign of the Brain being affected. Madmen are diſtinguiſh'd from *Dæmoniacks*, with which they are ſometimes confounded, in that the latter perform thoſe Things which ſurpaſs Humane Power, in vomiting of Pieces of Iron, Wood, Living Creatures, and the like, which is not done but by ſome ſupernatural Power.

The *Rabies*, or Madneſs from the Biting of a venemous Creature, is a Diſeaſe, as *Emul-*

ler ſays, that changes a Man into a Beaſt, and makes him ſo that he can ſcarce do any Thing Humane, but what repreſents the Manners and Nature of that Animal whereby we are bit. The Madneſs of a Dog is more conſiderable, though there are other Animals beſides the Dog that are ſubject to this *Outragiouſneſs*, as Cats, Goats, Wolves, *&c.* And we may obſerve, that the Biting of a Madman in this Caſe is very malignant and dangerous. There are ſeveral Things remarkable in this Diſeaſe. The Firſt is, that the ſlighteſt Wound, or the leaſt Touch of the Foam or Spittle of the mad Beaſt, will give it in Time. The Second is, that it is the *Hydrophobia* or Dread of all Sorts of liquid Bodies, join'd to every Kind of Paſſion, from whence this comes. 3. That the Leven of this Madneſs will remain hid ſeveral Years in the Body without being diſcover'd. 4. It is generated ſometimes, as we may ſee, from ſmall Animals either in the *Saliva* or *Urine*. Thoſe Animals that receive Madneſs from others; as for Example, a Man that turns mad from the Biting of a mad Dog or Cat, imitates the Actions of thoſe Animals that bit him, in barking like a Dog, or ſcratching like a Cat.

To know if the Dog that has bit you, and the Creature that is bit, is mad, ſome order Walnuts bruis'd to be put upon the Wound, and to leave it there ſome Hours; after which, to give it to your Pullen: If the Dog is not mad, the Fowl will live; but if the Dog is mad, he dies inſtantly. Others take the Blood that comes from the Wound, and make it into Paſte with Wheat-Flower, which they give to the Fowl, and if they die, the Animal is mad. This Sort of Madneſs is difficult to cure; for the Poiſon that remains a long Time in the Body, kills at laſt, and uſually three or four Days after the *Hydrophobia* begins. If there flows preſently a great deal of Blood from the Wound, and if it is well treated, one may ſtop and prevent the *Hydrophobia*; but if the Wound is heal'd too ſoon, we ought to be afraid of the *Hydrophobia*.

The *Crotick Delirium* or Love Madneſs, is, according to *Etmuller*, a Kind of Melancholy contracted by a true Paſſion of Love that is too exceſſive; for as there are People who become Melancholy from Sadneſs and Grief, ſo the ſame Thing may proceed from Love, by fixing the Spirits to a determinate Motion. We may know the Amorous *Delirium* by the Pulſe, which is very changeable, unequal, turbulent and irregular; and we may obſerve, that when we ſpeak of the Perſon that they love, the Pulſe is chang'd preſently, and becomes enlarg'd, quicker, and more violent; and that when you ceaſe to ſpeak any more of that Subject, the Pulſe flags, is diſorder'd and irregular as before.

Of the Cures of the Diſeaſes of the Head; *and particularly of the Operations of the* Polypus, Ozæna, *and* Bleeding *of the* Head; *with the Method how to ſtop the* Polypus. *From Mr.* Dion's *Courſe of Chirurgical Operations.*

THE *Polypus* is deriv'd from the two *Greek* Words, *Polu* many, and *Pous* a Foot, by reaſon this Excreſcence has many Roots like Feet, whence the *Latins* call it *Multipedes*. 'Tis a fleſhy, fungous and ſuperfluous Excreſcence, which forms it ſelf and grows in the Middle of the Noſtrils, and incommodes the Reſpiration. The *Polypus* commonly fixes on the *Os Ethmoides* or *Cribroſum*, and frequently the bony or griſly Parts of the Noſe, which being ſpungy, are more apt to produce it than the proper Bones of

of that Organ and the *Ethmoides*, which are of a harder Subſtance.

The *Polypus* frequently ſucceeds the *Ozæna*, and thoſe Ulcers of the Noſe which are caus'd by the Flux of acrimonious and melancholy Humours, which having corroded the Membrane with which thoſe bony Parts abovemention'd are cover'd, make room for the Fleſh to engender and grow daily; and that the more eaſily, becauſe it is impoſſible to reach them with any Medicaments, which otherwiſe might conſume them at the Beginning. The exceſſive Humidity which falls on that Part, in conjunction with a crude and pituitous Blood, help to feed it: This Blood not being qualified to produce ſound Fleſh, and be transform'd into the Subſtance of the Parts, fills the Pores of the griſly Parts of the Noſe, where meeting with ſome Ends of the Fibres of the mucous Membrane out of their Contexture, it animates and forms it into a *Polypus*, which it foments and ſtimulates to that Degree, that this Excreſcence not only fills the Noſtrils, but ſhows it ſelf in the Mouth behind the *Epiglottis*, and ſometimes extends ſo far as to deſcend into the *Aſpera Arteria*, where it endangers the Suffocation of the Patient whilſt aſleep, if due Care be not taken.

We obſerve Five Sorts of the *Polypi*: The Firſt being like a fungous and ſoft Membrane, reſembles a relax'd *Uvula*; it faſtens on the Cartilage in the Middle of the Noſe, and fills it with a tenacious and pituitous Humour. The Second is a whitiſh round Eminence, which is ſoft when we touch it; it proceeds from flegmatick Blood, and grows inſenſibly, till it occupies the whole Cavity of one Noſtril, and ſometimes thoſe of both. The Third is a harder Fleſh, whoſe Colour is brown, a little painful, engendred by a groſs melancholy Blood, which for want of being dilated by the *Lympha*, is almoſt ſcorch'd. The Fourth is a hard Tumour, like dried ſmoak'd Fleſh, and when touch'd, ſounds as tho' we ſtruck on a ſolid Body; it is inſenſible, and may be rank'd amongſt the confirm'd *Scirrhi*. The Fifth conſiſts of one or ſeveral *Carcinomatous* Tumours fix'd to the Cartilage of the Noſe, and produc'd from a melancholy and aduſt Blood: They are painful, and in Nature like a Canker; of all theſe Species, ſome are without Ulceration, though they emit a ſanious and viſcous Moiſture, and the other ulcerated and inceſſantly ſend out a fœtid and horrible ſtinking *Sanies*. A *Polypus* is known at Sight, and the Judgment the Surgeon ought to make depends on the Nature of the *Polypus*. Thoſe which are Carcinomatous or Cancrous, are incurable: Theſe he will know by the Hardneſs, livid and lead Colour, fœtid Smell of the Excreſcence, its Adherence to the oſſeous Blades, and the Pain it occaſions. This Sort of *Polypus* is not to be touch'd; but thoſe which are indolent, ſoft, flaccid, white or reddiſh, may be cured; and 'tis in caſe of this laſt Sort that we are allow'd to apply the Operation.

Authors propoſe Five Ways of performing it: Firſt, by Corroſion, 2*dly*, By Cauteriſing; 3*dly*, By Ligature; 4*thly*, By Inciſion; and 5*thly*, By Evulſion; which we ſhall only propoſe the Glory of being the Inventor, of which *Fabricius* pretends to, and we muſt own our Obligations to him, ſince it appears to be the Beſt of them all. We are to ſeat the Patient in a Chair a little leaning backward, and having turn'd his Face to the Light with a *Speculum Naſi*, we may dilate the Noſtril to make Room to introduce the Duck's-Bill Pincers, with the Ends of which we pinch the *Polypus* as deep and as near the *Baſis* as we can, then giving it one or two Turns, and drawing it gently, we pull it out together with its Roots: After which, we ſuffer the Noſe to bleed a little, to diſcharge and empty the Part. When the Palate is advanced as far as behind the *Uvula*, this Production uſually follows the Branch we find in the Noſe, becauſe both are in one continued Piece: But if that which ſhows it ſelf behind the *Uvula* proves long and thick, 'tis much better to pull the *Polypus* out at the Mouth than at the Noſe; this is eaſily done with a curved Pair of Forceps, which we may thruſt into the Naſal Clefts, which are longer than the Cavities of the Noſe, taking Care that we do not pinch the *Uvula* which is before the *Polypus*.

If after the Evulſion of the *Polypus*, the Patient yet feels ſomething in his Noſe which diſturbs him, and when looking into it, we find ſome ſmall Bit ſticking to the Bottom of the Noſe, with the Tweezers or

Pincers, ſhap'd like Sciſſars, which cut only at the End, we take away the reſt as far as we can, by reaſon 'twill otherwiſe ſerve as a Rudiment to produce others. After the Operation, we are to make the Patient reſpire, and draw through the Noſe warm Wine, which will thoroughly waſh all the Cavities fill'd with the humid *Sanies*, which the *Polypus* detain'd there; for otherwiſe it would not be neceſſary to draw the Wine thus, and make it fall into the Throat, to ſecure us that the Paſſage is open, for the Patients will perceive that by the ſhort and certain Proof of their own Feeling; and may judge of the free Egreſs and Regreſs of the Air, by the Facility with which they can breathe with their Mouths ſhut, which they could not before do. Of all the Chirurgical Operations, the Advantage of this is the ſooneſt felt, and the Patient reaps the greateſt Pleaſure; for the very Moment that he is deliver'd from ſuch an inſupportable Inconvenience, all his vital Functions, which before were ſuſpended and diſturb'd, reaſſume their ordinary Courſe, and purſue it without being retarded by an Obſtacle.

If the Flux of Blood be but moderate, we are to let it iſſue out to eaſe the Part: But in caſe of a *Hæmorrhage* we are to ſtop it, by injecting into the Noſe ſome aſtringent Liquor by a Syringe, or by filling the Noſtril, which muſt be long enough, and wetted in ſome ſtiptick Water. We are to dreſs the Part with corroſive Unguents to conſume all the Roots, which cannot be done without ſtrong Mundificatives, to which are to be added cauſtick Powders, ſtronger or weaker as occaſion requires. The *Polypus* is one of thoſe Diſeaſes that requires a good Regimen and Precaution, to purge frequently, and make uſe of ſudorifick *Ptiſans*.

There comes into the Noſe a ſordid Ulcer, which we call an *Ozæna*, which ſignifies an ill Smell, which ſtinks ſo, one cannot come near ſuch as have it when they Talk, without being ſtruck with a very diſagreeable Scent, whence they are inſupportable in Company. To cure theſe Ulcers, we are oblig'd to aſſiſt Nature, for they will not cure of themſelves. Over theſe Ulcers grow Cruſts, which fall from Time to Time, and are kept up, as well by the vicious Formation of the Part, as by the Mucoſities which muſt inceſſantly paſs through theſe Drains. We ſhould carefully examine whether theſe Evils are not fomented by ſome pocky Cauſe; becauſe then we are to have Recourſe to the grand Remedy: But if we have no Reaſon to ſuſpect any ſuch *Virus*, we are then to make uſe of the general and particular Remedies, which are to be Deſiccatives, in order to abſorb thoſe Humidities whence the Diſtemper proceeds. The Uſe of the ſudorifick *Ptiſan*, *Millepedes*, and *Mercury*, is Sovereign; and we apply to the Ulcer ſuch Remedies, as may cleanſe, dry, and incarnate it. We cauſe the Patient, by the Aſſiſtance of a ſmall Pipe, to draw or ſnuff up the Powders of Savine, Pomegranate-Shell, Orrice Root, burnt Allum, and Vitriol; and laſtly, put in Practice the ſmall Operation ſhown in *Dion*'s Courſe of Chirurgical Operations, *pag.* 320.

The Noſe is liable to all Sorts of Wounds; but thoſe which require the moſt expeditious Operation, are ſuch, as when by a Cut on the Ridge of the Noſe it is almoſt ſeparated from the Face, and falls on the Mouth, it muſt then immediately be return'd to its Place, and we are to give it a Stitch with a Needle at the upper Part, and in its Middle. This Stitch is to be perform'd with a crooked Needle threaded with a Wax thread; we begin to ſew from without inwards, at the lower Part of the Wound, and tie the two Ends of the Thread on a ſmall Bolſter, at the upper Part of the Noſe. I think it needleſs to make two Stitches more, one on each of the Wings of the Noſe, for the naſal Bandage will ſupply their Place; and beſides, we are to make as few Stitches on the Face as Neceſſity will allow, to avoid the Deformity of the Scars they leave behind. We lay on the Wound a Pledget charg'd with Balſam of *Peru* or that of *Arcæus*, then a Plaiſter and Bolſter above it, then a Band which has four Ends, which we faſten to the Cap, and with which we make the naſal Bandage: We are to obſerve, that the Plaiſter, Bolſter, and Band, are to have Holes made in them for the free Paſſage of the Air.

Though we are to have great Care of the Preſervation of the Face, and more than any other Part, we are yet oblig'd to ſubmit it to the Surgeon's Lancet: The various

Diſeaſes

Diſeaſes which frequently afflict it, require frequent Bleeding. We open the Veins and the Arteries; of the Firſt there are Four, which are the *Vena Preparata*, the *Angular*, the *Naſal*, and *Ranular Veins*; and of the Arteries there are Two, which are that of the Temples, and that of the Ears.

The Vein which we ſee in the Middle of the Forehead, is call'd the *Preparata*; it deſcends in a right Line, from the *Sagittal Suture* to the Middle, betwixt the Eyelids, and receives the Blood, which irrigates the fore Part of the Head, to carry it to the Jugulars. When the Surgeon is to open it, he makes a Bandage about the Neck with a Handkerchief, roll'd up like a Sauſage; he ought to have a Band and a Bolſter ready, ſuch as us'd in bleeding the Arm: The Lancet not differing from the common Sort. The Vein being riſen, he expeditiouſly opens it, that he may not keep the Throat too long ſtreighten'd. He ought to make the Orifice obliquely, and bear the Point upwards, then after Bleeding bind it up with a Band round the Head, like a Forehead-cloth.

The Bleeding of the Angular Vein is not attended with any more Difficulty. This is call'd ſo, becauſe plac'd in the great Corner of the Eye, betwixt that and the Noſe; wherefore the Opening of it is preſcrib'd to Patients, particularly in Inflammations of the Eyes. Firſt, a Band muſt be wrap'd about the Head ſeveral Times, and that tighter than in other Bleedings, with the ſame Ligature as to the Forehead or Jugulars: The Vein which is very ſteady being open'd, the Patient is to hold the Head down, that the Blood may fall into a Porringer, and not run down the Face. After Bleeding, apply a triangular Bolſter that is thick, to fill the whole Cavity of the Corner, and bind it on about the Head, leaving one Eye open.

Betwixt thoſe Two Cartilages which form the ſmall Ball of the Noſe, there is a *Vein* which does not appear without, and which is very ſeldom open'd, the Vein being ſmall, and affording little Blood. The Fourth Sort of Bleeding on the Face is that of the *Ranulæ*, which are two Veins ſituate under the Tongue near the String, the one on the Right, and the other on the Left. This Way of Bleeding is more practis'd than the others, becauſe there is more Occaſion of performing it, and it tends more to the Relief of the Patients, eſpecially in Quinſies. We need neither prepare Band nor Bolſters, but ſtreighten the Neck, and cut both the Veins under the Tongue, either with or without arming the Lancet. To make the Veins bleed freely, waſh the Mouth with warm Water; and to ſtop the Bleeding, uſe cold Water, or a little Vinegar and Water.

Arteriotomy is practiſed on no other Part but the Head: The Word is deriv'd from *Arteria* an Artery, and *Temain* to cut, by reaſon that this Operation conſiſts in opening an Artery, in order to draw out the Blood which it contains. The Reaſon why this Operation is perform'd on the Head only, and on no other Part, is that the Skull being a hard Body ſituate under an Artery, we may by preſſing it with a Bolſter ſtay'd by a Band eaſily ſtop the Blood, which is not practicable with the ſame Eaſe on the other Parts of the Body, the Fleſh being incapable of making the ſame Reſiſtance with the Skull. We open the Artery either upon the Temples, or elſe lower near the Ear, without any Sort of Ligature, but by placing the Patient's Head lower than the reſt of the Body, that the Blood may eaſier flow thence. We make uſe of the common Lancet, and open it by Puncture, as we do the Vein; And in order to ſtop the Blood with the greater Security, we lay on the Orifice half of a Garden Bean on the flat Side, above that the Bolſter and a Band, which we carry round the Head, and cloſe a little tighter than ordinary.

Of the Hydrocephalum. *From the ſame Author.*

THE *Hydrocephalum* ſignifies Water, or a Dropſy in the Head, when the Skull is ſo full of Water that it is as it were drowned. Authors diſtinguiſh them into Two Sorts, *viz.* External, when the Water is without the Brain; or Internal, when under that bony Helmet. Of the Firſt, there are alſo Two Sorts; the Water is either betwixt the Teguments and the *Pericranium*, or betwixt the *Pericranium* and the *Cranium*: And Writers make Three Sorts of the internal ones; the Firſt is, when the Water is contain'd betwixt the *Cranium* and *Dura Mater*; the Second, when 'tis betwixt that Membrane and the *Pia Mater*; and the Third, when it is in the Ventricles and proper Subſtance of the Brain.

Theſe Diſeaſes which are peculiar to Children, may, like all other Dropſies, proceed from internal Cauſes: They may alſo be owing to external ones, as a harſh Delivery, in which the Child's Head has been too hard preſs'd, and lengthen'd in order to get it out: Or elſe, if after the Birth the Midwife attempts to new mould the Head of the Child; which ſhould never be done. The external *Hydrocephale* is eaſily known by the Swelling and Inflammation of the whole Head, by the Softneſs of the Tumour, which yields to the Finger when touch'd: But the Internal is more difficult to diſcern; we determine concerning it, by preſſing on the Sutures which yield, and which are wide and diſtant from each other; 'tis alſo known by the Weeping, by the Heavineſs of the Head, and by Drowſineſs.

All the Species of the *Hydrocbale* require the Surgeon's Hand, to give Iſſue to the Water, which is the Diſeaſe. The Ancients apply'd Two potential Cauteries; one to the Beginning of the *Sagittal Suture*, and the other on the *Lambdoide Suture*. The Scars being fallen, they let out the *Lympha* at two Orifices, and when they believed that there were two Parcels of Water under the *Pericranium*, they open'd theſe two Places, that they might ſerve as a Drain. They made uſe of *Cephalicks* externally, making Embrocations of Oil of Camomil, Melilot, and Dill, by which Means they pretended to cure theſe Diſeaſes.

I am rather for the Scarifications of the declining Part of the Head, through which the Waters that have ſoak'd in there, may drain off, and come away by little and little, better than by Cauteries, too near the ſuperior Parts of the Head. Some Years ſince, a Child brought into the World an *Hydrocephale*; Two longitudinal Inciſions were made at the poſterior and inferior Part of the Head, through which all the Water diſtill'd by Drops: I adviſ'd the making them in that Place, becauſe that the Child being laid down, the Waters had liberty to run off; I caus'd the Nurſe to apply to the Child's Head a good Bolſter dip'd in warm Wine, which was frequently renew'd, and the Patient was cured ſo, that he is very well. When the *Hydrocephale* is internal, that is, when the Water is under the Skull, there is no other Way of Drawing it out than by the *Trepan*, which is apply'd in the ſame manner as has been ſufficiently deſcrib'd. If the Waters are only betwixt the Skull and the *Dura Mater*, and there is none under that Membrane, a Cure is to be hop'd for; but 'tis very rare that they gather under the Skull, and don't diſperſe into the Ventricles, and ſmalleſt Reſorts of the Brain, which muſt be wholly inundated, which appears by the Symptoms that accompany theſe Diſeaſes, which are what has made me advance, that all internal *Hydrocephales* are incurable and deſperate.

Of the Cures of Diſeaſes of the Head *and* Brain: *From Mr.* St. Hilaire. *And Firſt of the* Alopecia *or Shedding of Hair, Scurfs,* Hydrocephale, &c.

WHEN the falling off of the Hair proceeds from a confirm'd Pox, the ſeveral Preparations of Mercury, Sudorificks, as volatile Salts of Vipers, Sal Armoniac, *&c.* are very proper; for by theſe Means, the Pox it ſelf, as well as the *Alopecia*, is cured. Take Goat's Dung reduc'd to Aſhes, and mix it with Oil of Eggs and ſome Drops of Oil of Cloves, and apply: Or make a frequent Fomentation with Juice of Radiſhes; or uſe a Liniment made of Moles burnt to Powder, and made up with Spirit of Honey; an Ointment made of Ants, Flies, Turpentine, and the White of an Egg, is good. Oils of Sweet Almonds, *Laudanum*, Myrtle, or Lentile Wood, mix'd together in equal Parts, is excellent to hinder the Hair from falling.

To remove the Scurf from the Head, all Medicines that ſweeten the Acid of the *Lympha* promote vigorous Perſpiration, and that are Sudorifick, are ſerviceable, and particularly hot Baths and the Bagnio: So a Fomentation made with Wormwood, Fumitory, Century, and ſome Oil of Tartar *per Deliquium*: Or, an Ointment of Camphire, half an Ounce; Roch-Allum, Vitriol, Verdigreaſe, Sulphur Vivum, and Soot, of each two Dram; Oil of Sweet-Almonds and Hog's Lard, of each two Ounces; incorporate them well in a Mortar. When Worms gnaw or eat up the Hair, waſh the Head well with a Decoction of Aloes and Myrrh, or a Bull's Gall.

The Medicines in the *Hydrocephale* are of ſeveral kinds: As Firſt, Purgatives, ſuch as the Cornachine Powder; and Diureticks of volatile Salt of Amber, the vegetable Salts, purified Nitre; in ſhort, all kind of Diaphoreticks, as volatile Salt of Vipers, Hartshorn, Millepedes, *&c.* A Fomentation of hot Water made with a Spunge upon the Head, and repeated ſeveral Times, is uſeful to dry up the Seroſities; ſo likewiſe Spirit of Wine, wherein Scabious has been infus'd, with the Tincture of Flowers of St. *John*'s Wort and Roſemary made of Spirit of Wine tartaris'd.

Of the Phrenzy. *From the ſame Author.*

AS the *Phrenzy* is an Inflammation of the Brain and its Membranes, with a continued *Delirium* and an acute Fever; ſo gentle Evacuation is in the firſt Place proper, as Bleeding and Clyſters. Vomits ought cautiouſly to be exhibited, and Purges that are only Benign and Lenitive, as Caſſia, the ſolutive Salts, Tamarinds, the purging Syrups, Waters, *&c.* And as Blood-letting ought to be frequent and plentiful in this Diſeaſe, ſo ought you to uſe cooling Juleps and Apozems of Endive, Pimpernel, Lettice, and Nightſhade-water, with the Syrups of Pomegranate, Citron, Violets, Barberries, *&c.* to which add a little *Laudanum*. The greater Houſeleek bruis'd and mix'd with Breaſt-Milk, allays the *Phrenzy*, and diſpoſes to reſt, if apply'd upon the Head: So, Take Roſe-water, ten Ounces; Opium, a Dram; Saffron, half a Scruple; apply hot with a double Cloth upon the Forehead: Or, Take Ointment of Populeon, half an Ounce; Opium, twelve Grains; Camphire, half a Scruple; Oil of White Poppy-ſeeds, *q.ſ.* for a Liniment. Take, Betony and Borage Waters, of each an Ounce and half; Tincture

of Roſes, one Ounce; *Laudanum* liquid, 20 Drops; Confect of Hyacinth, a Dram; Syrup of Citron, ſix Drams; Spirit of Sal Armoniack, ten Drops; make a Draught for the Bed-time, to be repeated as the Phyſician ſees occaſion.

We may alſo apply to the Head, living Creatures, as Fowls, Pidgeons, *&c.* that are ſplit or cut in the Middle, and ſtrew'd or powder'd with Coriander, Lettice, and white Poppy, Camomil, Roſes, Sanders, Camphire, and other the like proper Remedies, to ſtrengthen the Parts and provoke Sleep. When Frenetick People have Pain and Difficulty in making Water, as it happens ſometimes, the following Fomentation is very proper to provoke Urine: Take Leaves of Pellitory of the Wall, two Handfuls; the Leaves and Roots of Parſly, one Handful; Onions, N° 2; boil 'em in Water, and add to the Decoction two Ounces of Oil of Scorpions, and make a Fomentation upon the Pubes.

Of Madneſs and Melancholy.

THE Cure of Madneſs and Melancholy conſiſts in allaying the Rage of the Spirits, as well by Purging, Bleeding and Bliſtering, as by ſtrong Vomits; after which appropriate Medicines may be given with *Hypnoticks*, *&c.* Take of black Hellebore, one Dram; Sena, one Dram and a half; Aniſeed, a Scruple; Cinnamon, half a Scruple; Salt of Tartar, 12 Grains; make an Infuſion hot in 8 Ounces of Whey: To the ſtrain'd Liquor, add two Drams of the Electuary of Prunes Solutive for a Potion. Or, Take Extract of black Hellebore, a Scruple; Flowers of Antimony martiated, five Grains; Extract of Troches Alhandal, two Grains; with Syrup of Apples compound, make into Pills for a Doſe.

If Vomiting is required, an Infuſion of Wine in the Antimonial Cup, or Tartar Emetick is to be exhibited, otherwiſe the following Opiate made of the Emetick Powder dulcified, whereof give ſix or eight Grains in a little Venice-Treacle and Confect of *Alkermes*. Or this in an inveterate Caſe; Tartar Emetick, ten Grains; Roſin of Jalep or Scammony, eight; Nutmeg, ſix Grains; take Conſerve of Borage Flowers and Violets, of each two Ounces; Confect of the Bark of Myrobalans, ſix Drams; Coral, Pearl, Ivory and Crabs Eyes, of each prepar'd a Dram; Confect of Hyacinth, two Drams; Syrup of red Poppies, as much as to make it into an Electuary: The Doſe is two Drams, drinking after it a Draught of the following Water; Take Balm, Borage, Bugloſs, Pimpernel, Betony, Fumitory, of each five Handfuls; Elder Flowers, Borage, Roſemary and Cowſlips, of each four Handfuls; the Peels of ſix Oranges and eight Lemons; of Camphire, a Dram and half; cut and ſhake the whole together in ſix Quarts of Whey, and preſerve it for drinking, ſweetned with a little Sugar. Or, Take volatile Spirit of Sal Armoniac ſuccinated, half a Dram; the carminative Spirit, two Drams; Tincture of Caſtor, Saffron and Cinnamon, of each a Scruple; Tincture of Steel, half an Ounce; Fumitory and Centaury Water, of each two Ounces; Syrup of Cinnamon, one Ounce; mix, and give four Spoonfuls at a Time by Intervals to the Patient.

Take Mallow and Violet Leaves, Flowers of Lillies of the Valley, and Poppy, of each two Handfuls; Camomil, red Roſes, Primroſes, and white Lilly Flowers, of each a Handful; put 'em hot into a Bag, and apply to the Head, being firſt ſtew'd. Or, Take Spirit of Wine, two Ounces, in which there is half a Dram of Camphire firſt diſſolv'd, and having ty'd up in a Knot three Grains of Opium, and four of Musk, bind it upon the Temples of the Patient, and let him ſmell from Time to Time of the Opium and Musk. Or, Take Roſe-water, or that of Frogſpawn, five Ounces; half a Scruple of Saffron, and make an *Epithemium* to be apply'd to the Forehead.

Of Stupidity, Hydrophobia, &c.

THE Cure of Stupidity and Loſs of Memory, conſiſts in reviving the Animal Spirits, by Cephalick, Spirituous, Odoriferous and Aromatick Medicines; as, Eſſences of Sage, Roſemary, Balm, Aloes, Lavender, Stœchas, Cardamum, Caſtor and Amber, ſnuff'd up the Noſe, or taken inwardly in a due Quantity. Ambergreaſe is one of the beſt Remedies for ſupporting the Vigour of the Animal Spirits, and ſtrengthening the Memory in old People; Given in a Powder with equal Parts of Sugar-Candy, or made into an Eſſence or Tincture, prepar'd with Spirit of Roſes or Balm: Or, it makes an excellent Cephalick Tincture with *Alkermes*, or extracted with Spirit of Lilly of the Valley.

Take Conſerve of Flowers of Lilly of the Valley, ſix Ounces; Roots of Acorns candied, Green Ginger from the Indies, and Nutmegs, of each half an Ounce; Ambergreaſe well ground, two Drams; Aloes-Wood, yellow Sanders, Zedoary-Root, Cubebs, *Jamaica* Pepper, of each a Dram and half; Coral prepar'd, two Drams; with a due Quantity of the Syrup of the Green Ginger make into an Electuary, whereof give two Drams; drinking upon it ſix Spoonfuls of the following diſtill'd Water: Take of the freſh Leaves of the Miſſeltoe of the Apple-Tree, ſix Handfuls; of ſmall Sage, Roſemary, Thyme, Calamint, Penny-royal, Margoram, Rocket, of each four Handfuls; Roots of Angelica, Maſterwort, of each ſix Drams; Zedoary, Galingal, Calamus Aromaticus, of each two Ounces; Cloves, Nutmegs, Mace, Cinnamon, Ginger, of each one Ounce; Cubebs, Cardamums and Grains of Paradiſe, of each ſix Drams: Cut and bruiſe them, then put them in to infuſe three or four Hours cold, in ſix Quarts of good Canary, and diſtil for Uſe.

The Cure of the *Hydrophobia* conſiſts in driving away the Poiſon or Malignity by proper Remedies, internal as well as external, and not to heal the Wound too ſoon. The internal Medicines are. Roots of Gentian and Garlick, with the Leaves of Rue, Sage, Betony, Carduus, Scordium and Tormentil, given in Venice-Treacle or Carduus-Water: As for Example, Take Rue, Vervaine, Sage, Plantane, Mint, Polipody, Wormwood, Mugwort, Balm, Betony, ſmall Century, of each equal Parts; make a Powder, whereof give a Dram. Take Powder of Gentian, Myrrh, of each a Dram; Crabs-claws Powder, two Drams; mix all together in Wine, and give it to the Patient in Wine. Immerſion in the cold Bath is proper in this Caſe, eſpecially after purging with Tincture of *Hellebore* and *Hiera Picra*, or ſcarrify the Part affected, and waſh it with warm Wine, applying afterwards the following Specifick: Take one Onion, a Head of Garlick, with an Ounce of Treacle, and as much Leven, mix together and apply: Or, burn the Place where the Wound is made from the Mad Creature with a red-hot Iron, that powerfully draws out the Malignity.

Of the Lethargy, *Want of Sleep,* &c.

THE Cure of the *Lethargy* conſiſts in theſe Two Things; in cleanſing the Firſt Paſſages, and in appropriate Medicines. The Cleanſing or Purging of the Firſt Paſſages, is made either by Vomiting with the Emetick Wine, Tartar Emetick, or Tincture of Tobacco drawn from Spirit of Wine; which has a peculiar Virtue in theſe Caſes. Purging again is perform'd another way by Catharticks, as Scammony ſulphurated, Reſin of Jalap, Troches Alhandal, Extract of Agarick, Caſtor, *&c.*

The appropriate Medicines are, *Sternutatories* or ſneezing Powders, Mixtures of various Forms, Epithemums, *&c.* Take Tobacco Powder, and that of Lilly of the Val-

ley, of each a Dram; white Hellebore-Root, a Scruple; diſtill'd Oil of Marjoram, four Drops; and Spirit of Sal Armoniac two; blow a little of this up the Noſe with a Quill. Or, Take Spirits of Sal Armoniac ſuccinated, and Hartſhorn, of each a Scruple; Oxymel of Squills, two Drams; Carduus-water, one Ounce; make a Mixture for a Doſe. Or, Take Rue Vinegar, an Ounce; Spirit of Sal Armoniac with Caſtor, and Spirit of Wine camphorated, of each a Dram; make a Mixture to put up the Noſe with a Rag or Piece of Spunge, to revive the Spirits. An Epithemum compos'd of the Juice of the larger Houſeleek, Vinegar and Nitre, apply'd to the Teſticles, gives great Relief, and will diſperſe preſently the Fumes of Wine that may occaſion a more than ordinary Sleepineſs.

To remove the *Apoplexy* by Way of Clyſter, *&c.* uſe the following Preſcriptions: Take Leaves of Rue, Origanum, *Aſarabacca*, of each an Handful; Flowers of Lilly of the Valley and Stœchas, of each three Pugils; Seeds of Carthamum and Pulp of Coloquintida in the Apple, ſix Drams; boil in common Water, of which Decoction take eight Ounces, wherein diſſolve Electuary of *Hiera Picra* with Agarick, one Ounce; Extract of Caſtor, one Scruple; Bull's Gall, two Drams; Oil of Rue, ten Drops; exhibit for a Clyſter. Or, for a Suppoſitory, Take Species of *Hiera Picra*, two Drams; a Bull or Ox's Gall, one Dram; Salt of Rue, Sal-Gem or Nitre, a Dram; with Honey form it into a Suppoſitory, which anoint with *Quercetan*'s Oil of *Colocinthis*. Take Smallage Seed, black Cummin, Rue, of each a Dram; Caſtor, a Dram and half; make two little Balls to tie to the Temples. Or, apply the following Cataplaſm to the Neck: Take *Cantharides*, a Scruple; *Euphorbium*, twelve Grains; Caſtor, a Scruple; the ſharpeſt Leven, half an Ounce; ſpread upon a Piece of Leather.

Of the Vertigo.

THE Cure of the *Vertigo* depends upon inſtantly removing the Cauſe, which is ordinarily ſituated in the Stomach, and this is done by Vomiting and Purging, ſtrengthening the Inteſtines and Ventricles, and refreſhing the Animal Spirits by proper Specificks that allay their Impetuoſity. Amongſt the Purgatives, the following are recommended: Take of Maſtich Pills, a Scruple; Extract of Agarick, ſix Grains; Scammony ſulphurated, three Grains; Reſin of Jalap, two Grains; Oil of Amber rectified, as much as will ſuffice to make them into Pills. Or, Take of the Catholick Extract, one Scruple; Reſin of Jalap, ſix Grains; Oil of Aniſeed and Rue, of each three Drops; make into five Pills for a Doſe; and thoſe Days the Patient does not purge, give plentifully of the *Sal Volatile Oleoſum* in any proper Vehicle: Or rather, Take Barley-water, ſix Ounces; Spirit of Humane Skull, Tincture of Caſtor, of each a Dram; white Sugar, half an Ounce; mix, and give to the Patient two Spoonfuls from Time to Time.

The Preparations made from Sal Armoniac are uſeful, and all theſe from Antimony and Steel, eſpecially if made into Pills with Aloes, and continued for ſome time: So Cream of Tartar, one Scruple; Sal Armoniac, four Grains; Salt of Amber, half a Scruple; given in a Glaſs of Wine. Or, Take cryſtal Mineral, a Dram; Sal Armoniac, a Scruple; Crabs-Eyes, two Scruples; Humane Skull, four Scruples; make into a Powder, which divide into ſix equal Parts. External Remedies are made of the Cephalick and Aromatick Plants, bliſtering Plaiſters apply'd to the Neck and Soles of the Feet, bleeding in the Jugulars, *&c.*

Internally the following have been much eſteem'd: Take Peacocks Dung prepar'd, three Drams; Cinnabar of Antimony, Cubebs, Galingal, volatile Salt of Amber, half a Dram; Sugar aniſated, *q.ſ.* make a Powder for ſeveral Doſes, which give in Betony or Sage-Tea. Or, Take Root of Sea-Pæony, one Ounce and half; Pæony-Seed, Coral prepar'd, white Amber, of each three Drams; Powder of Pearl prepar'd, freſh Pæony Flowers

Flowers dry'd in the Sun, of each two Drams; Sugar-Candy, one Ounce: The Doſe is a Dram taken as before.

Take Swallow-Water, with Caſtor, Balm-Water diſtill'd from Wine, of each a Dram and half; Spirit of Sal Armoniac, half a Dram; volatile Salt of Amber, five Grains; Spirit of black Cherries and Lillies of the Valley, of each a Dram; *Laudanum*, three Grains; Syrup of Orange-Peels, ſix Drams; mix for an Hyſterick Draught, to be given, particularly in a Paroxiſm of the *Vertigo*. Take Powder of *Doronicum* or Wolf-bane Root, Florentine Orrice, Lavender Flowers, Roſe-wood, Spirit of Lilly of the Valley, of each a Scruple; mix, and keep in a Box or little Bag to ſmell to.

Of the Apoplexy. *From* St. Hilaire, Cole, Torres, &c.

THE *Apoplexy* is a ſudden Loſs of external Senſe and Motion; the Part affected is the Brain with its Nerves, and the Cauſe proceeds from the too Acridneſs of the *Lympha* that is loaded with Salts and obſtructs the Nerves. This Diſtemper likewiſe comes from the Extravaſation of Blood in the Head, or when the Brain is wounded; or laſtly, from the too frequent Uſe of ſtrong Narcoticks.

When the Phyſician is call'd, and finds the Patient in a profound Sleep, void of Senſe or Motion; the Firſt Thing he does is to bleed, then to apply ſome volatile or acrid Things to the Noſe and Mouth, to cauſe them to be well fomented with Cephalick, Spirituous, and Purgent Medicines: Then to vomit, which is the beſt and ſafeſt Method: Laſtly, to preſcribe Clyſters, Cauteries, Cupping and Scarification: After the Fit is relieved, Purgatives are very neceſſary to diſcharge the Humours, and frequent gentle Emeticks as follows.

The True Emetick Wine of *Rulandus*; Take *Crocus Metallorum* three Times purified, two Ounces; *Spaniſh* White-Wine, a Quart; put all in a Glaſs Matraſs well ſtop'd, infuſe three Days on a good ſtrong Fire, ſhaking it often: This done, open the Matraſs, and add a Pint of good Roſe-water, half a Dram of Saffron, and two Sticks of Cinnamon groſly bruis'd; ſtop the Glaſs again, and ſet it over the Fire ſix Hours; then filter the Liquor clear, thro' Cap Paper, and give from two to four Ounces for a Doſe. Take green Tobacco, and extract a Tincture from it, with rectified Spirit of Wine, and give the Patient two Drams of it with Honey, and ſtrait he ſhall diſcharge a great Quantity of mucous Slime from the Head, and if this Medicine be often repeated, it will relieve from the *Apoplexy*, if it is not too far gone and mortal.

As *Rulandus's Vinum Benedictum* is one of the beſt Emeticks in this Caſe; ſo Clyſters compos'd of this, Coloquintida and Spirit of Wine, are excellent for Revulſing the Humours. Or elſe, Take Rue, Sage, Origanum, of each one Handful; Flowers of Lilly of the Valley, Primroſe and Stœchas, of each one Pugil; Hemp-ſeed and Agarick, of each ſix Drams; boil in common Water, in eight Ounces of which, diſſolve *Hiera Picra*, one Ounce; Juice of Rue, half an Ounce; Caſtor, two Drams. The Diſcutients are, firſt, *Mynſicht's* Apoplectick Spirit, Spirit of Sal Armoniac ſuccinated, of Humane Blood, Urine and Skull, the Apoplectick Balſam, Snuff and Rue Vinegar, and the *Acetum Benedictum Vitriolatum*, Spirits of Roſemary, Sage Flowers, Lilly of the Valley, and Tincture of *Guajacum*, Caſtor, *&c.*

Take of volatile Salt of Amber, half a Dram; Venice-Treacle, one Dram and half; Caſtor in Powder, two Scruples; Oil of Rue, Amber and Roſemary, of each three Drops; make an Opiate, whereof give the Size of a Nut in a Draught of the following Apoplectick-water: Take Arom Roots, one Pound; Leaves of Garden Scurvy-graſs, Roſemary, Sage, Lavender, Flowers of Lilly of the Valley, of each two Handfuls; ten Orange Peels and thoſe of ſix Lemons; Winter's Bark, three Ounces; white and yellow Sanders, Shavings of Ivory, of each half an Ounce; Roots of Galingal, Calomus Aromaticus and Florentine Orrice; of each two

Ounces; Jujubs, Cloves, Nutmegs, of each one Ounce; Cardamums, ſix Drams; Coriander-ſeed, half an Ounce: Bruiſe them groſly, and let them infuſe 24 Hours in a Gallon of White-Wine, then diſtil according to Art.

Take Conſerve of Betony Flowers and Fumitory, of each one Ounce; Ambergreaſe in Powder, a Dram; Crabs Eyes and Claws, of each four Scruples; Pæony Flowers powder'd, Aloes Wood, yellow Sanders, of each a Dram; Salt of Wormwood, a Dram and half; with Syrup of Pæony make an Electuary, whereof the Doſe is two Drams in two Ounces of the following Water: Take Arom Roots, Sea Pæony, Angelica and Maſterwort, of each half a Pound; Sage, Roſemary, Marjoram, Wild Purſlane and Watercreſſes, of each four Handfuls; Flowers of Primroſe, Cowſlips and Marigolds, of each three Handfuls; ſix Oranges and four Lemon Peels, cut and bruis'd together; infuſe them in three Quarts of New Milk and one of *Malaga* Wine, then diſtil.

If the Patient ſtands in need of *Sternutatories*, give white Hellebore, Flowers of Marjoram, and Lilly of the Valley, Pellitory of the Wall and Caſtor, of each a Scruple; make a Powder of them. When the *Paroxiſm* is abated, give the following Purgative, or the like: Take Sena, three Drams; white Agarick, two; Roſemary Flowers and Cubebs, of each half a Dram; infuſe in Sage-water ſix Ounces for a Night and a Day; then to the ſtrain'd Liquor add, Syrup of Betony, half an Ounce; Scammony ſulphurated, ſix Grains; make a Potion. Or, Take Extract of *Diacarthamum*, a Scruple, diſſolv'd in Spirit of Lilly of the Valley; to which add, Reſin of Jalap, five Grains; Syrup of Stœchas, half an Ounce. Or, Take *Crato*'s Amber Pills, and that of Cohy, of each half a Scruple; Troches Alhandal, four Grains; Oil of Marjoram, a few Drops for a Doſe of Pills. Or, Jalap in Powder, one Scruple; Scammony ſulphurated, five Grains; Oil of Marjoram, two Drops; mix for a Doſe.

Of the Palſey *and* Paraplegia. *From* St. Hilaire.

IN the *Palſey* properly ſpeaking, and in the *Paraplegia* that ariſes from an internal Cauſe, or follows the Apoplexy; we ought to diſſolve and diſſipate the Morbifick Matter by Sudorificks and other gentle Appropriates. But as in the *Paraplegia* as well as the *Paralyſis*, the Cauſe is ſometimes internal, it is better to reſolve and teterge by Digeſtives, and to purge by proper Evacuatives. The Principal are the acrid and purgative Clyſters and Vomits that are to be given at the Beginning, as Flowers of Antimony, with Scammony, the Cornachine Powder, the Catholick Extract, *Hiera Picra*, *&c.* The internal Specificks are much the ſame with thoſe in the Apoplexy. The chief Specifick, ſays *Michael*, is the Primroſe, and the Spirit of Tartar internally and externally. The Extract and Wine, made of *Enula Campana*, with the Compound Spirit of Tartar, Salt, Nitre, *&c.*

For Preparatives and Purging, Take, Primroſe Water and Sage Water, of each two Ounces; Syrup of *Stœchas*, one Ounce; the Arithetick Tincture, half an Ounce; for a Doſe. Or Take, Tartar Vitriolate, two Scruples; Briony Flower, a Scruple; divide into equal Parts. Or Take, Arthritick Pills, one Scruple; Reſin of Jalap, three Grains; Extract of Troches Alhandal, two Grains; Oil of Fennel, two Drops; make a Doſe of Pills. Take, the Fœtid Pill, a Scruple; Scammony Sulphurated, eight Grains; Oil of Marjoram, one Drop. Or Take, Conſerve of Primroſes, one Dram; Reſin of Jalap, eight Grains; Scammony Sulphurated, two Grains; Tartar Vitriolate, three Grains; mix for a Bole.

Michael aſſerts to have relieved ſeveral Paralytick Patients with this Powder: Take, the Raſpings of a Humane Skull, one Scruple; Cinabar of Antimony, five Grains; Volatile Salt of Amber, two Scruples; divide this into four Papers for as many Doſes, drinking after each ſome of the following Decoction: Take, Saſſafras Shavings, two

two Ounces; Roſemary, one Handful; Bay Berries, two Ounces; boil all in Water and Wine, of each a Pint; put them into a Cucurbit, with its Head, and add to the Diſtillation four Ounces of Spirit of Juniper, and three of *Sal Armoniack.* After the Diſtillation, mix four Ounces of Syrup of *Stœchas* to the whole, and give five or ſix Spoonfuls of this Sudorifick Decoction to the Patient, after one of the Papers of Powder firſt directed.

Externally all Things that comfort and ſtrengthen the Nerves are proper to be us'd, as Spirits made of Sage, Roſemary and Lavender; *Hungary* Water rightly prepar'd; Tincture and Oil of Amber, *Caſtor*, *Galbanum*, *&c.* an Unguent made of Juices of Squills, four Ounces; wild Cucumber and Rue, of each one Ounce; *Euphorbium*, *Caſtor*, *Sagapenum*, *Ammoniacum*, and *Bdellium* diſſolv'd in Vinegar, of each a Dram and half; Myrrh, Frankincenſe, Pellitory of the Wall, and Nitre, of each a Dram; Oils of Elder, Turpentine and *Euphorbium*, of each half an Ounce; a ſufficient Quantity of White Wax to make it into the Conſiſtence of an Ointment.

Take, Pitch, *Galbanum*, *Sagapenum*, and Gum *Ammoniacum*, of each an Ounce; Roots of Pellitory of the Wall, and Muſtard-ſeed, of each half an Ounce; *Euphorbium*, two Drams; Yellow Wax, three Drams; Oil of Turpentine, what ſuffices to make a Plaiſter. Take, Maſtich, half an Ounce; Myrrh, *Laudanum*, *Caſtor*, Sarcocol, of each two Drams; Galingal, *Calamus Aromaticus*, Clove Gilliflowers, Cinnamon, Nutmegs, Zedoary, Cubebs, of each half an Ounce; Dittany, Round Birthwort, Great Comfry, of each two Ounces; Gum Elemi, *Opoponax*, *Benjamin*, of each an Ounce and half; powder all groſly; and add, Oil of Bays, three Ounces; Turpentine, a Pound and half; Spirit of Wine, ſix Ounces; infuſe all together, and diſtil. There will firſt run a Water, then an oily Liquor, and laſtly a Matter like Honey, with which rub the Spine of the Back, and all the Paralytick Parts.

Take, of Frankincenſe, Myrrh, Sarcocol, Maſtich, Saffron, of each an Ounce; Camphire, a Dram; Sage Leaves, ſix Handfuls; Flowers of *St. John's Wort*, Mugwort, and Camomil, of each two Handfuls; Earthworms, half a Pound; cut and ſtamp all together, adding a Pint of White Wine, Oil of Juniper and Linſeed, of each ſix Ounces; Turpentine, a Pound; infuſe over a warm Fire, then diſtil according to Art, and uſe the Balſam that is diſtilled to the Parts affected. Warm Baths made of the Cephalick and Aromatick Herbs; likewiſe with the Uſe of Appropriate Clyſters as before directed, are very ſerviceable.

Of the Epilepſy. *From the ſame Author.*

IN the Cure of the Epilepſy or Falling Sickneſs, we muſt always have Regard to the general Methods, as Clyſters, Purgatives, *&c.* Then we may have Recourſe to Diaphoreticks, Cephalicks, and proper Antiepilepticks, to correct and ſweeten the acrid Sowrneſs that pricks and afflicts the Nervous Parts. The *Clyſters* that are proper are ſuch as theſe: Take, of Flowers of *Pæony*, Lime Tree, Lillies of the Valley, of each three Pugils; Rue-ſeed, a Dram; Agarick, one and a half; boil in common Water, and to four Ounces of the ſtrain'd Liquor add Electuary of *Hiera*, with Agarick, half an Ounce: Or if Gripes attend, add half a Dram of Oil of Camomil, Rue, Dill, or Cummin-ſeed; and apply to the Navel the Plaiſter of Bay Berries, malax'd with Oil of Rue or Cummin.

Where Purgatives are required, give the following: Take, of Extract of Black Hellebore, or the Cathalick *Panchymagogon*, fifteen Grains; *Mercurius Dulcis*, a Scruple; Troches of Alhandal, four Grains; Oil of Amber, three Drops; make into Pills. Or Take, Reſin of Jalap or Scammony, ten Grains; *Mercurius Dulcis*, fifteen; Tartar Vitriolate, twelve Grains; make into a Powder. Or Take, Jalap Powder, a Scruple; Scammony Sulphurated, four Grains; Syrup of Pæony, and Spirit of Lillies of the Valley, of each half an Ounce. Or Take, Conſerve of Pæony Flowers, a Dram; the Catholick

tholick Purging Powder, a Scruple; Extract of Black Hellebore, ſix Grains; make a Bolus. Or Take, Pills of Cochy, and Gum Pills, of each a Scruple; Reſin of Jalap, ſix Grains; Oil of Rue, four Drops; make into Pills.

The *Diaphoreticks*, *Cephalicks*, and *Anti-epilepticks*, are theſe: Take, Black-Cherry Water, and that of Lilly of the Valley, of each an Ounce; *Langius*'s Epileptick Water, half an Ounce; Syrup of Pæony, ſix Drams; to which add a few Drops of Tincture of *Caſtor* and Amber. Or Take, Coriander Prepared, two Drams; Zedoary, Seeds of Pæony and Purſlane, of each a Dram; Raſpings of Humane Skull, and Elks Claws, of each three Drams; mix for a Powder, whereof two Drams is a Doſe; to be taken in Spirit of Lilly of the Valley, or *Langius*'s Epileptick Water: So Spirit of Vitriol, and rectified Spirit of Urine, mix'd together, and taken in Pæony or Lavender Water at the New and Full of the Moon, is of great Service.

Take, freſh Roots of Black Hellebore, Miſſeltoe of the Oak, ſix Drams; Pellitory of the Wall, and Pæony Seed, of each three Drams; Betony and Roſemary Flowers, of each two Drams; make a Tincture with Spirit of Wine; then diſtil in *Balneo Mariæ* to the Conſumption of half the Spirit, ſo that the Eſſence remains at the Bottom for Uſe, whereof a Dram may be taken in Pæony or Lime Flower Water. Or Take, the Volatile Salt of Amber and Humane Skull, of each a Scruple; *Caſtor*, two Drams; make an Infuſion of 'em in Spirit of Wine, and after due Circulation and Digeſtion, you have a Tincture for Uſe, ten or twenty Drops whereof may be often given in any of the Waters aforeſaid, or the Epileptick Water of *Langius*, that follows:

Take, Humane Skull Raſp'd, Miſſeltoe of the Oak, Roots of Pæony, and White Dittany, of each two Ounces; Flowers of Lilly of the Valley, two Handfuls; Lavender, Roſemary and Lime Flowers, of each three Handfuls; Cinnamon, ſix Drams; Nutmegs, half an Ounce; Cloves, Mace and Nutmegs, of each two Drams; bruiſe them, and put them in Infuſion eight Days in four Quarts of *Malmſey* Wine; then diſtil in a Sand Heat. The Doſe is from a Spoonful to two or three. A Spirit of Wine, or Cordial corrected by *Mathiolus*, are very proper upon the like Occaſions. Take, Ginger, four Drams; of the three Sanders, of each ſix Drams; Cloves and Galingale, of each two Drams and half; Mace, a Dram; of the two Cardamums, and Black Cummin-ſeed, of each three Drams; Zedoary, half an Ounce; Aniſe and ſweet Fennel Seed, of each a Dram; Mint, Thyme and Calaminth, of each two Drams; Powder *Diambra*; put the Aromatick Powders in a ſmall Cucurbit, and pour upon them three Pints of Spirit of Wine, ſtop the Glaſs cloſe, and put it in a warm Place for eight Days; then bruiſe the Flowers in a Quart of Spirits, and ſet them to digeſt four Days. Powder the reſt, and put them into a Cucurbit, whereto pour on four Quarts of Spirits, and infuſe hot for five Days; then add all together in a large Cucurbit, with its Head and Receiver, which place in *Balneo Mariæ*, and diſtil gently off a fragrant Spirit of Wine. Beſides theſe Spirits, you have the Volatile Salt and Oil of Humane Skull, with an Extract of the ſame, with the Volatile Salt and Oil of Humane Blood, directed by Mr. *St. Hilaire*, in his Remedies for all Diſeaſes of Humane Bodies, from *p.* 216 to 221.

Of Trembling *and* Convulſions.

THE Cure of theſe Indiſpoſitions conſiſts in Nervous Medicines, Carminatives, and proper Cephalicks, as well externally as internally apply'd, that are capable of abating or allaying the Irritation of the Nervous Parts, and giving Strength to them, after the like Manner as in Paralytick Caſes. For this Purpoſe, Sudorificks of Bezoar, *&c.* with Flowers of Roſemary, Sage, and Lilly of the Valley, are ſerviceable. A Trembling procur'd by Minerals is cur'd by Minerals, as Mercurials by Antimony and Cinabar of An-

Antimony. See *Horſtius* and *Zacutus Luſitanus*. So Gold attracts Mercury. Beſides, thoſe Things that fortify the Nerves internally given are good, as Flowers of Roſemary, *Stœchas*, *&c.* ſo outwardly Oils of *Caſtor* and Amber.

Take, the Arthritick Pills, one Scruple; *Mercurius Dulcis*, fifteen Grains; Scammony Sulphurated, ſix Grains; Extract of *Caſtor*, ten Grains; make into Pills for a Doſe: After which, Give, Hartshorn Unburnt, Raſpings of Humane Skull, of each a Scruple; the *Sulphur Auratum* of Antimony, ſix Grains; mix for a Powder, to be taken in two Spoonfuls of *Langius*'s Epileptick Water, or the Spirit of *Mathiolus*.

For external Uſes, make a Fomentation with Spirit of Tartar well rectified, and Oil of the Aſphaltick Trefoil. Or Take, Myrrh, Epatick Aloes, Spicknard, Dragon's Blood, Frankincenſe, Mummy, and *Opoponax*, of each two Drams and half; *Carpo Balſamum*, Saffron, Maſtich, Gum Arabick, Liquid *Storax*, Calaminth, of each two Drams and half; Cowſlips, two Handfuls; Turpentine, the Weight of the whole; powder and mix all well together, and draw from thence a Balſam by Diſtillation, to be rub'd upon the Spine of the Neck, Back, and Parts affected. So a Decoction made with Sage, Roſemary, Lavender, Marjoram, Earthworms, and Claret, is very ſingular to waſh the Limbs with, eſpecially if you add thereto a little Nard Oil, *Caſtor*, and Spirit of Wine.

In a moderate Convulſion, give the following Powder: Take, of Natural Cinabar, a Dram; Powder of Humane Skull and Amber, of each a Dram and half; the Powder of Burnt Swallows and Moles, Red Coral and Pearl, of each two Scruples; Sugar of Pearl, three Drams; make a Powder, whereof give a Dram for ſeveral Days together. Take, Conſerve of Sage Flowers, an Ounce; *Laudanum*, three Grains; *Caſtor*, a Dram; Camphire, twelve Grains; make an Opiate for three Doſes. Take, of *Caſtor*, White Pepper, and Parſly Seed, of each equal Parts; which powder and ſift; and then give every Morning a Dram in a Spoonful of Honey, and two of *Cowſlip* or *Pœony* Water. This is a Sovereign Remedy for the Convulſions call'd the *Tetanos* and *Opiſthotonos*. Take, Roots of *Enula Campana*, Pœony, Mace, of each a Dram and half; Bay Berries, half a Dram; Roſemary Flowers, Sage, Thyme, of each a Scruple; *Species Diamoſchi* and *Diambra*, of each half a Scruple; make a Powder, whereof the Doſe is a Dram in Lavender Water. Take, Oil of Turpentine and Earthworms, of each two Ounces; of *Caſtor*, four Scruples; make a Liniment, with which anoint the Convuls'd Part. The Convulſion that happens by the pricking of a Nerve, is cured by pouring upon it Diſtilled Oil of Turpentine, and applying a Plaiſter upon it, made of *Euphorbium* and Turpentine, with a little Wax. A Convulſion that happens after violent Purging, is allay'd by *Laudanum*, and ſometimes *Venice* Treacle or *Diaſcordium*.

The End of the Second Volume.

A SHORT

Alphabetical Index

TO THIS

VOLUME.

A.

ABdomen. Page 5
Abdomen, and its Parts. Le Clerk 485
--- Its Diseases. 516
Abscess open'd. 357
Alopecia. 679
Anasarca. 550
Anatomy. 1
Anatomical Instruments. 2
Anatomy of the Eyes. 37
Anatomy of the Brain. 639
Aneurism. 423
Anthrax. 374
Apoplexy. 668
--- Its Cure. From *St. Hilaire, &c.* 683
Aqueous Humour of the Eye. 156
--- Unnatural Superfluity. 188
Arteries. 340
Arteries. *Cowper* 405
Aspera Arteria. 603
Asthma, and its Cure. 632, 634
Atrophy. 549
Atrophy of the Eye. 192

B.

Bladder. Page 20, 515
Blisters. 367
Bloody Urine. 565
Brain, its History. 639
Brain dissected. 644
Bronchotomy, its Operation. 621
Bubo. 374
Burns from Gunpowder. 320

C.

Cachexy. 549
Cancer. 469
--- Operation. 472
Cancer of the Breast. 475
Cancers. From *Beckett* 479
Cataract of the Eye. 137, *&c.*
Cataract, its Causes. 161
Cataract, Difference. 162
Cataract, Signs Diagnostick. 163
Cataract, Signs Prognostick. 164
Cataract, if cur'd by Medicine. 167
Cataract Couch'd. 168

Ca-

INDEX.

Cataract Milky. *Page* 170
Cataract Cheesy *&c.* 172
Cataract Black. 175
Cataract False. 177
--- Shaking. 180
--- Mix'd. 183
Cauteries. 363
Cæliack Passion. 531
Cerebel. 642
Cerebrum dissected. 33, 34, 35
Cholera Morbus. 530
--- Cured. 536
Circle of the Eye. 156
Colick, and Cure. 531 and 542
Consumption, and its Cure. 631, 636
Convulsion. 665
--- Cured. 686
Cornea of the Eye. 153
--- Its Diseases. 196
--- Abscess. 199
--- Pustules. 198
--- Ulcers. 201
--- Fistula. 202
Corpus Callosum. 641
Corns. 385
Cough, and its Cure. 637
Cranium dissected. 31
Chrystalline of the Eye. 155
--- Protuberance. 178
--- Abscess. 182
--- Displaced. 185
--- Spotted. 186
Cupping. 365
Cuticula manag'd. 6
Cuticula, what. 62
Cutis. 63

D.

Delirium. 671
Diabetes. 565, 566, 567, 569
Diaphragm. 26
Diarrhœa. 531
--- Cured. 536
Dissections General. 4
Dropsy. 550
--- Its Cure. 553
Dysentery. 531
--- Cured. 537
Dysury, and its Cure. 564, 569

E.

Ear dissected. 40
Ear describ'd, 207
--- The Auricle. 209
Ear, the Tympanum. *Page* 211
--- The Labyrinth. 213
--- Use of the Parts. 221
--- Its Diseases. 232
--- Cured. 287
Ecchymosis. 378
Emphysemis. 385
Empyema. 628
Epilepsy, and its Cure. 666, 685
Epinictides. 384
Erysipelas. 378, 389
Essera. 384
Eye describ'd, and its Parts. 151
Eye, its Diseases. 157
--- Atrophy. 192
--- Synchisis. 193
--- Rhexis. *Ibid.*
--- Falling out. 194
--- Wounds, *&c.* 195
Eye-lids, Lashes, *&c.* their Cures. From *Dion* 280
Exomphalos. 517

F.

Fibres. 394
Ficus. 384
Fistula Lachrymalis. 465
Fistula in the Breast. 628
Fontanels. 363
Furuncle. 377

G.

Gall-Bladder. 509
Genital Parts. 22, 23
Glands in general. 431
Glands of the Mesentery. *Ibid.*
--- Of the Omentum. 433
--- Of the Pancreas. 434
--- Of the Spleen. 435
--- Of the Liver. 436
--- Of the Kidney, *&c.* 437
Gland Thymus. 438
--- Of the Gullet. *Ibid.*
--- Of the Thyroide. 439
Glands Parotid. 440
--- Maxillary. 441
--- Of the Head. 443
--- Of the Eyes. 445
--- Axillary. *Ibid.*
--- Of Generation. 447
--- Of the Penis. 449
--- Of Female Generation. 450
--- Of the Breast, *&c.* 452
Glaucoma. 177, 183
Gutta Serena. 190

INDEX.

H.

Hare-lip. Page 293
Head. 29, 31
--- Its Containing Parts. 649
--- Diſeaſes and Cures. 660
Hæmoptoſis. 637
Hæmorrhoids. 532
Heart. 600
Heart, unuſual Palpitation, ſo as to break the Ribs 266
--- Its Motion. 606
--- Ferment and Texture. 615
--- Contracting Fibres. 618
Hernia of the Navel, &c. 517
Hernia of the Belly. 520
Hernia cured. 521
Hernia Inteſtinalis. 534
Herpes. 378
Herpes Exedens. 329
Hydroa. 384
Hydrocephalum. 678
Hydromphalos. 517
Hydrophobia, and its Cure. 674, 681

I.

Iliack Paſſion, and Cure. 532, 542
Impetigo. 380
Inteſtines. 11
Inteſtines. *Verheyen* 499
--- Their Diſeaſes. 528
Iſchury, and its Cure. 564, 569
Iſſues. 363
Itch. 380

K.

Kidneys prepar'd. 20
Kidneys deſcrib'd, &c. 513
--- Their Diſeaſes. 560
King's Evil, &c. 454
--- Cured. 458
King *William*'s Caſe. 577

L.

Lacteal Veins. 15
Lacteals. 431, 500
Leaches. 367
Leproſy. 380
Lethargy, and its Cure. 664, 681
Leucoma. 204
Liver. 17, 509
--- Its Diſeaſes. 547
--- Cure. 551
Lungs. 603
Lyentery. Page 531
Lymphaticks. 509
Lymphæducts. 431, 435
Lythotomy. 563

M.

Madneſs. 673
--- Its Cure. 680
Mediaſtinum, and its Veſſels. 597, 599
--- Its Diſeaſes. 627
--- Cures. from 628 to 630
Medulla Oblongata. 643
Melancholy. 672
--- Its Cure. 680
Meliceris. 385
--- Obſervations. 461
Members. 393
Membrana Adipoſa, Carnoſa, &c. 66
Meſentery. 11, 502
--- Its Diſeaſes. 545
Muſcles, their Diſeaſes and Cures. 275
Muſcles of the Tongue and Uvula cur'd. 289
Muſcles of the Abdomen. 8, 82
--- Of the Anus, &c. 18, 78, 90
--- Of the Breaſt. 25, 77, 103
--- Of the Larynx. 29, 76, 99
--- Of the Face. 30, 74, 94
--- Of the Shoulders, &c. 44, 106
--- Of the Arm, &c. 47, 48, 49
--- Of the Hand. 51, 115
--- Of the Head. 52, 107
--- Of the Thigh and Leg. 56, 57, 122, 126
--- Of the Foot. 61, 129
Muſcles in general. 67
--- Their Names. 81
Muſcles of the Teſticles. 88
--- Of the Yard. *Ibid.*
--- Of the Urinary Bladder. 89
--- Of the Eye and Lids. 91, 92, 152
--- Of the Ear. 95, 96
--- Of the Back, &c. 111
Muſcles deſcrib'd. 134
Muſcles of the Larynx and Uvula, new Deſcription. 225
--- Obſervations. From *Steno* 238
--- Their Motion. From *Mayow* 269
Myology, or Doctrine of the Muſcles. 137

N.

Nerves. 394

O.

Oedema. 390
Oedematous Tumours. 379

Oelo-

INDEX.

Oeſophagus. Page 496
Omentum. 10, 495
Ophthalmia. 157, &c.
Ophthalmia Strumoſa. 465
Optick Nerve. 154
--- Its Diſeaſes. 190
Ozæna. 674

P.

Palpitation of the Heart, &c. 629
Palſey, &c. 670
--- Its Cure. 684
Pancreas. 16, 506
Paraplegia, and its Cure. 670, 684
Pericardium, &c. 601
--- Its Diſeaſes and Cures, from 627 to 630
Peripneumonia. from 627 to 630
Peritonæum. *Lyſerus* 10
Peritonæum. *Verheyen* 494
Phlegmon. 371
Phlyctenes. 384
Phrenzy, and its Cure. 672, 679
Phygeton. 377
Phymoſis. *Ibid.*
Phyſadracia. 384
Phthiſick, and its Cure. 631, 636
Pleura. 599
--- Its Diſeaſes and Cures. 627, 628, 629, 630
Pleuriſy. 229
Pneumatomphalos. 517
Polypus in the Heart. 595
Polypus in the Noſe. 674
Pterygion. 204

Q.

Quinſey. 621
--- Its Cure. 624

R.

Reſpiration. from 607 to 614
Retina of the Eye. 154
--- Its Diſeaſes. 189

S.

Samaritan Balſam. 311
Sarcomphalos. 517
Scirrhus. 469
Scirrhous Tumours. 379
Scurvy. 391
Serpigo. 378
Seton apply'd. 356
Small-Pox. 65
Spermatick Veſſels. 19
Spitting of Blood. 637
--- Its Cure. 638
Spleen. Page 16, 507
--- Its Diſeaſes and Cures. 557
Squint Eyes. 205
Steatoma. 385
Sternum. 596
Stomach. 11, 496
--- Its Diſeaſes and Cures. 523
Stone. 561
Strangury, and its Cure. 564, 569
Struma, Obſervations. 460
--- Suppurated, &c. 461
--- Extirpated. 462
Strumous Ulcers. *Ibid.*
Strumous Ulcers with Caries. 463
Suture of the Tendon. 351
Syncope. 629

T.

Teneſmus, and its Cure. 531, 538
Thoracick Duct. 500
Thorax. 24, 25, 27, 28, 597
--- Its Diſeaſes. 620
--- Cure. 626
Thymus Gland. 438, 599
--- Its Diſeaſes and Cures. from 627 to 630
Trachea. 605
--- Its Diſeaſes. 621
Tumours in general. 369
Tumour Enkyſtated. 361
--- Enkyſtated Baſtard. 390
Tumours, their Obſervations. From Mr. *Le Clerk* 386
Tumours of the Belly and Navel. 517

V.

Varicomphalos. 519
Varix. 429
Veins. 403
Veins. *Cowper* 414
Vertigo. 664
--- Its Cure. 682
Vitreum of the Eye. 154
--- Diſeas'd. 187
Ulcers in general. 322
--- From *Belloſte* 223
--- From *Wiſeman* 324
Ulcers in particular. 327, 328, 329, 330
Ulcer Eating or Phagedænick. 327
--- Nomous. 328
--- Herpes Exedens. 329
--- Putrid and Sinuous. *Ibid.*
Ulcers of the Stomach. 526

INDEX.

Ulcers of the Kidneys. *Page* 567
--- Of the Trachea and Gullet. 624
--- Of the Lungs, and their Cures. 631, 636
Vomiting. 527
Ureters. 20, 513
Uvea of the Eye. 153
--- Its Diſeaſes. 191
Uvula. 29, 76, 99, 224
--- Its Diſeaſes. 289

W.

Warts. 385
Worms in the Guts, and their Cure. 539
Wounds in General. 295
--- In the Limbs. 301
Wounds. From *Vaugion* Page 303
--- From *Belloſte* 306
Gun-ſhot Wounds. 317
Wounds Gun-ſhot dreſs'd. 334
--- In the Muſculus Biceps. 339
--- By Musket-Ball in the Thigh. 340
--- Of the Nerves. 416
--- Of the Veins and Arteries. 419
--- Of the Trachea and Gullet. 624
--- Of the Lungs. 631

Y.

Yellow Jaundice. 548
--- Its Cure. 552

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